PAPER TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Vol. 109, No. 17 Thursday, October 26, 1939 Price Ten Cents

Newsprint Capacity in North America Ample

Canadian Manufacturers Endorse Statement of American Newspaper Publishers Association That Present Mill Capacity Is Ample For Any Reasonable Increase In Consumption—Production Rising—Other News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 23, 1939—Newsprint manufacturers here thoroughly endorse the statement issued by the American Newspaper Publishers Association that there is ample capacity in the United States, Canada, and Newfoundland to care for any reasonable needs of publishers in the matter of newsprint, even when taking into consideration possible substantial increases in consumption. As far as Canada is concerned, the mills, it is stated, could easily increase production by as much as 30 per cent. The manufacturers are glad to have the Publishers' Association warning their members against laying in more than normal supplies as insurance against shortage, since there is no reason whatsoever to anticipate a shortage and buying for hoarding would only create a spot market which could not be justified on the basis of supply and demand, but which would create a disorderly and runaway situation in regard to prices.

Production on the Increase

There has been a substantial increase in newsprint production in Canadian mills during the past month, though as a whole the industry is still running much under capacity. Operations have now about reached the level that prevailed in December, 1937. In Newfoundland the Anglo-Newfoundland Development Company's mill at Grand Falls, which for a long time had been working on a five-day week, has now gone into six-day a week production, which is the schedule also prevailing in the Bowater's mill at Corner Brook. Progress is reported on the expansion program of the latter company.

France May Take Pulpwood

Simon Lieberman, of Paris, France, representative of an organization of French lumber brokers, has been looking over the pulpwood situation in Nova Scotia. In this connection it is said that French and English interests are contemplating the purchase of a large quantity of pulpwood in this country. Mr. Lieberman was asked if the large quantity of pulpwood, scattered at various Maritime points for shipment to Germany, but which the war cut short, would be purchased by the companies they represented; the reply was that they were going to look into that.

When war seemed imminent German vessels hurriedly left Maritime ports for home, many of them without completing their cargoes of pulpwood which were left on the docks.

Forestry Program a Success

From Ottawa it is reported that the Dominion's section of Canada's National Forestry Program has been an outstanding success. Boys who went into camp early last summer in poor condition, scrawny, and in some cases under-nourished are to-day well developed, bright, eager to work and anxious to learn. A spirit of self-discipline and co-operation has been developed which is very gratifying, and visitors to the camp speak highly of the conduct and good manners of the members.

Aside from this rehabilitation of youth, much good of a practical nature has been accomplished in added protection for the forests and training in forest practice. Young men encamped in the various National Parks and Dominion Forest Experiment Stations across the Dominion have been engaged in many diversified projects, including the construction of roads, trails, fire guards, telephone lines, cabins, tourist campsites, and similar works. Almost as important have been the various kinds of improvement cuttings in the timber stands, where large areas of forest have been thinned, trees selected for the final crop pruned, and, in general, desirable species favored so that they may grow to maturity in the shortest possible time.

In addition to these activities, many of the youths have been engaged in special studies, assisting the regular staff of the department in the remeasurement of sample plots, timber cruising and other survey work.

Another important activity of the young men is the collection of forest insects which provides valuable knowledge for scientific purposes. This information is also of practical application in giving forewarning of possible oncoming forest insect infestations. Similarly collections being made of forest plants are adding to the knowledge of forest soils and of growth possibilities for different timbers of commercial importance.

Paper Men and Foresters Attend Field Day

Demonstrations of Successful Reforestation Methods Given Near Wisconsin Rapids As 100 Visitors Inspect Nekoosa-Edwards Paper Co.'s Nursery and Plantings — Grant For Fox River Approved — Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., October 23, 1939—Paper manufacturers, conservationists and foresters joined Wednesday of last week for a forest field day in the vicinity of Wisconsin Rapids, Wis., where practical and successful reforestation was demonstrated. The gathering was attended by 100 men from Wisconsin and Minnesota, and was sponsored by the Nekoosa-Edwards Paper Company, Nekoosa, Wis., the Wisconsin Conservation Commission, and the University of Wisconsin.

The day was spent inspecting the state forest nursery at Nepco Lake, and the nursery and plantations of the Nekoosa-Edwards Paper Company. The visitors toured the grounds and witnessed demonstrations of tree lifting, drill and broadcast seeding, composting, seed and tree cold storage methods, packing of field planting stock, transplanting methods, fire lanes and firefighting, fuel wood cutting, a state fire radio demonstration, and inspection of forest ranger stations. They made a barge trip across Nepco Lake to visit plantations of Norway and white pine. William Brenner, superintendent of the state forest, and F. G. Kilp, head forester for Nekoosa-Edwards company, were in charge of the tours.

John Alexander Acts as Toastmaster

In the evening, the visitors were guests at a banquet at the Bull's Eye Country Club, with John E. Alexander, president and general manager of Nekoosa-Edwards company, as the toastmaster. Gov. Julius P. Heil of Wisconsin, was the principal speaker.

James Corcoran, chairman of the Wisconsin Conservation Commission, declared he saw reforestation in Wisconsin as a "joint enterprise" of government and industry and a "gigantic task to make productive again land stripped of its wealth."

Another speaker was Dean Chris L. Christensen of the college of agriculture of the University of Wisconsin, who said the NEPCO forests are a comprehensive example of good land use planning.

F. J. Sensenbrenner, president of Kimberly-Clark Corporation, Neenan, Wis., added praise for the NEPCO operations as pointing the way for the return of raw materials essential to the paper industry. D. C. Everest, president and general manager of the Marathon Paper Mills Company, Rothschild, Wis., also was scheduled to speak but could not be present.

Paper Box Manufacturers Busy

Business of Hummel & Downing Company, paper box manufacturers of Milwaukee, Wis., is running at peak levels and its employment has been increased to 850 persons, the highest level since 1937, according to Arthur Ratcliff, president.

Three shifts are working in a number of departments to keep abreast of the flood of orders which has developed since the wave of commodity buying set in after the declaration of war in Europe. Food industries are contributing heavily to the rush, but the demand from many other industries also has increased.

The paper mill department and power plant are working 48 hours per week, and others are working 44, a gain of four hours since September 1.

Offices of the company are to be moved December 1 from the Bankers' Building to the plant.

Bergstrom Adds to Water Plant

Construction of a one-story addition over a portion of the waer clarifying plant of the Bergstrom Paper Company is to be started at once. It is to be used as a laboratory. The addition will be of brick and concrete 52 by 80 feet in size, and the estimated cost is $10,000. The contract has been awarded to Fluor Brothers Construction Company, Oshkosh, Wis.

The company's new $10,000 floculator and clarifier building will be completed in about two weeks, with the work also being done by the Fluor company. The equipment provides the first treatment of water after it has been drawn from the Fox River. The equipment has been in operation since August, but the superstructure had not been completed at that time.

To Speak at Annual Safety Day

Three executives of Kimberly-Clark Corporation will be speakers at the annual safety day November 2 of the employees of the mill at Kimberly, Wis. They are F. J. Sensenbrenner, president, and Ernst Mahler and S. F. Shattuck, vice-presidents. They will appear on the evening program, climaxing a day of events. An old-fashioned minstrel show will be staged by mill workers as the entertainment feature.

A children's program will be held in the morning at the mill clubhouse. The public will be taken on conducted tours of the mill so they can see safety practices in actual operations. A movie, "The Romance of Papermaking" will be shown each group at the end of the tour.

WPA Grant for Fox River Approved

A WPA grant of $51,622 has been approved by President Roosevelt for the power plant to be erected by the City of Kaukauna, Wis., on the site of the former Patten Paper Company dam on the Fox River. Excavation has already been started. Most of the work has been completed on the tailrace and in excavation of the channel. The generator and turbine have been ordered. It is expected the power house will be completed by October, 1940.

To Erect Aluminum Sulphate Plant

Construction is to be started at once by the General Chemical Company, Chicago, Ill., of a plant here for the manufacture of liquid aluminum sulphate, used for water purification and neutralizing of paper mill size.

Chicago Market Steady Under Good Demand

Paper Trade In Midwest Area Reports Steady Continuation of Buying and Market Situation Satisfactory—Work of Laboratory In Cellulose Field—Mills Issue New Lines—Carton War Nears Close—Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., October 23, 1939—Chicago paper executives are more and more inclining to the belief that the market itself is in a very satisfactory condition even discounting the effects of the critical situation in Europe. The "hysteria" is now well quieted down and Chicago representatives in nearly all grades report a steady continuation of demand and a basic market situation which is reported as "satisfactory". Sulphites are reported to have held all recent gains under the new prices with business holding up well. Book papers continued to range into higher ground with the pulp situation reported to be accentuating buyer interest in this and the cover market. The kraft situation is returning to "normalcy", with a market structure designed to take full and constructive benefit of the improved business demand. Groundwoods are quoted as very firm and specialties which enjoy an upturn in volume due to seasonal demands, including holiday trade, are reporting a most healthy situation. Waste papers continue to hold strong. All in all, the market here has obviously received a healthy stimulus from the Fall meetings of the N.P.T.A. both as to orderliness and full appreciation of the constructive job urged by those who attended the meetings last month.

Work of Laboratory in Cellulose Field

While Peoria and Illinois in general have been congratulating themselves on the development of the Northern Regional Research Laboratories of the U. S. Department of Agriculture, the paper industry is just becoming cognizant of the importance of this development to the trade. The new laboratory, one of four built by the Government, is to be utilized to a major extent in developing new methods for the production of cellulose from agricultural materials. Dr. E. C. Lathrop, well known to the paper trade, is to be in charge of the Peoria research laboratory which is, in itself, an indication of the importance to be given to cellulose research. Dr. Lathrop has been connected with several affiliates of the paper industry including the Crown-Zellerbach corporation. He is a widely known authority on commercial production of cellulose products. The Peoria Laboratory came to Illinois after the Peoria Association of Commerce and State authorities had collaborated in indicating the usefulness of a location in this State in close proximity to the raw materials used in the various research procedures to be carried on under the supervision of Dr. Lathrop.

Peninsular Issues New Lines

The Peninsular Cover Manufacturing Company of Ypsilanti has made a rather impressive entry into the Chicago paper market this week with a broadside describing several new products of that company. The portfolio is printed letterpress on Dearborn Cover, India, 20 x 26 double thick. Inserted samples are also enclosed, the same including Dearborn Cover, gold and brick colors—65 (130 M). A booklet, likewise enclosed, is Peninsular's Offset, 25 x 38—70 (140M). The latter is included so that the customer may make his own demonstration of what it means for a booklet to take a cover. Chicago distributors of Peninsular Products are Berkshire Papers, Graham Paper Company, Messinger Paper Company, Noser Paper Company, Parker, Thomas & Tucker, Bradner Smith & Company, Swigart Paper Company, Whitaker Paper Company and the James White Paper Company. A useful index method keeps the products stocked by the various distributors including offset, Twilmark Laid, Orkid Cover, Dawn Flake, Publishers Cover, Publicity Cover, Tuscan Cover, Dearborn Cover, Zamora Cover, North Shore Cover, Notre Dame Intaglio and Dubl-Color Duplex.

Carton War Approaches Close

It begins to look as though the paper carton versus glass container war in Chicago was approaching its close. This week the Chicago board of health asked the city council to permit the use of paper cartons —a rather sudden about-face which is reported to be the cause of more delay due to investigation. However, the health board's request was embodied in a recommendation that an amendment to the milk ordinance be drawn which will copy a model ordinance approved by the United States public health service. Local writers are hailing the decision—though the celebration may be a bit premature—as a "break" for the consumer—pointing to the ease of transporting the container, elimination of certain delivery duties, saving in weight and space occupied by the bottle and an added convenience for customers and making unnecessary a deposit required in most stores on bottles. Of approximately 950,000 quarts of milk and cream in sizes up to a quart sold in Chicago daily, it has been estimated that 76,000 or one-fifth of the store sales will be in cartons. This is on the basis of the sales records in the suburbs and other large cities. The number of paper containers sold will probably reach 95,000 daily, roughly amounting to 228,000 pounds of paper required each month. Experts said that beside the increased paper business there will be added work for plants manufacturing the containers and container equipment if the Chicago paper market is opened to them. It has been reported that the American Can Company may build a new plant in Chicago to take care of this market.

Packaging Institute Meets

Chicago was host this week to a large number of paper and packaging experts who met at the Edgewater Beach Hotel, Chicago, for the first annual packaging institute. The meetings, held on October 12 and 13, were given an additional impetus by the arrangement of exhibits which indicated the wide and varied usage of paper products

Book and Writing Paper Mills at Capacity

Ontario Mills and Coated Paper Plants Have Backlog of Orders and Accept New Business Only At Prices Prevailing On Date of Shipment — Hoarding By American Newsprint Publishers Feared—Other Mill News.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., October 23, 1939—All the book and writing mills as well as specialty and coated paper plants throughout Ontario are very busy at the present time and have orders ahead for six and eight weeks. All business is taken at the price prevailing on the date of delivery. The pulp mills are also rushed and have contracts ahead for a year. Prices will be adjusted from time to time and some plants, which have been in the red for many months, are now getting in the black. Quotations are very firm and much more business could be secured were the plants able to run above capacity. Coating papers mills are having considerable difficulty in getting the requisite amount of paper for coating purposes. The printing trade is humming and buying is proceeding freely. For many months stock has been kept on the shelves but wholesalers are now being pressed for fulfillment of orders. Many special and form runs which have been limited in the past, are now being undertaken on a large scale as the situation in Europe has made several firms desirous of stocking up. The only complaint that jobbers have to make is that they cannot fill orders. As stated a few weeks ago, all paper prices except those on wrapping and newsprint, were withdrawn. It is expected by some wholesalers that a new list will be issued by the mills about the first of December. Patent coated board took a jump of ten per cent during the past week and the board mills are all active, while those turning out flour sacks and other containers have been rushed to the limit. One large firm stated this week that its plant was busier than any season since 1929 and others report that, except for a few months flurry in orders in 1937, they have not been so filled up in the past decade. Pulp quotations are strong and ground wood is now commanding from thirty-two to thirty-six dollars a ton, delivered.

"Hoarding" by American Publishers Feared

In regard to the news situation the *Financial Post* says that one of the weaknesses seen in the action of the newsprint manufacturers for the first quarter of 1940 was the possibility that American publishers might start stocking up as they did in 1937. Such a danger was not altogether fanciful and attention has been drawn to the fact by the American Newspaper Publishers Association that some members are "hoarding", even allowing a ten per cent increase in consumption. It has been rightly pointed out that ordering beyond normal requirements might cost the publishers far more than any apparent saving and if the publishers do not take the long range view they are heading for troubles they alone can avoid.

Plan For $250,000 Acme Paper Mill

Some time ago the Acme Paper Box Company, Limited, Toronto, and associated companies of which J. L. Oelbaum is president, completed plans for a paper mill at 358 Carlaw Ave., Toronto, adjoining the bag factory and box plant. The plant when completed was to cost about $250,000 and was to be equipped with six beating engines and five Jordan engines while the machine was to be a combination Fourdrinier Harper consisting of five cylinders and an 80 foot wire, 42-48 in. dryers, 2-12 roll stocks of calender cutters and drum winder. The plant would require 750 electrical h.p. and 800 steam h.p. The building was to be 227 feet long and parrallel Thackery St., a distance of 264 feet. The power plant was to be 40 x 44 feet and the chimney 125 feet high. It is understood owing to war conditions and the uncertainty of the future, construction may be deferred. Orville H. Moore, paper mill consultant, who had built some of the most profitably operating mills in Canada designed the mill.

A further increase in the number of workers employed in the bush getting out saw logs and pulpwood as a result of the war is in evidence in the Algoma district. One thousand and more men were engaged in September than in August. According to Crown Timber Agent, D. Smith, of Sault Ste. Marie, there are now 2,363 men at work. The biggest employer is the Ontario Paper Company, Limited, Thorold, which has 1,300 men on its pulpwood limits. Two new hardwood concerns are also operating near Sault Ste. Marie. Reports received from Port Arthur are to the effect that the movement of pulpwood cutters has begun in that area and although the number is over one hundred per cent above last season, the demand has not yet been fully met. More than one thousand men have been hired through the Dominion employment service at Port Arthur during the last four weeks.

Lake Sulphite To Open Its Nipigon Mill

The first sign of rejuvenation of the large industry which was promised by the now defunct Lake Sulphite Pulp Company is the reopening of the Nipigon Corporation mill of the firm. It is announced that seventy-five men will go back to work this week and the mill will be in full operation in a few days. The plant produces ground wood pulp and was purchased by the Lake Sulphite Pulp Co., several months before that organization failed in February of last year. The mill has a capacity of sixty tons of pulp daily.

Goes With Baldwin Paper Co.

John P. Parsons for many years connected with the sales activities of International Paper Company, has joined the Baldwin Paper Company, Inc., one of the leading metropolitan distributors of mill brand papers and other paper products, as vice-president.

Mr. Parsons represents the third generation of his family in the paper industry. His grandfather founded the paper manufacturing company of W. H. Parsons & Co., in 1853—with mills in Maine, and was one of the early presidents of the American Paper and Pulp Association.

The Himmell Brothers and Jack Parsons look forward to years of pleasant association.

Financial News of Pulp and Paper Industry

Kimberly-Clark Doubles Profits — Brown Co. Receives Largest RFC Loan — Increased Earnings For Container Corp. — Rolland Increases Dividend — Sutherland, U. S. Gypsum and Others Report Profits.

New York Stock Exchange

High, Low and Last for the Week Ending October 25, 1939

	High	Low	Last
A. P. W.	3	3	3
Armstrong Cork Co.	40¾	37	40¾
Celotex Corp.	11½	10	11½
Celotex Corp., pf.	62	59	62
Certain-Teed Products Corp.	8⅛	7	8⅛
Certain-Teed Products Corp., pf.	36¾	29	36¾
Champion Paper & Fibre Co.	28¼	26	28¼
Champion Paper & Fibre Co., pf.	100	100	100
Congoleum-Nairn Co.	25⅝	23	25½
Container Corp. of America	16⅜	15¼	16⅜
Continental-Diamond Fibre Co.	8¾	8	8½
Crown-Zellerbach Co.	16¼	15⅛	16¼
Crown-Zellerbach Co., pf.	88½	86	88½
Flintkote Co.	22⅞	19⅛	22⅞
Robert Gair	5½	4¾	5½
Robert Gair, pf.	18⅜	16	18⅜
International Paper & Power	14¼	13⅜	14¼
International Paper & Power, pf.	51½	48¼	51½
Johns-Manville Corp.	81¾	78⅞	81
Johns-Manville Corp., pf.	128½	125½	125½
Kimberly Clark Corp.	37½	36	36¾
MacAndrews & Forbes	31	29¾	31
Masonite Corp.	43¼	38	41¾
Mead Corp.	13	12⅛	13
Mead Corp., pf.	72	72	72
Paraffine Companies, Inc.	46	41¼	46
Paraffine Companies, Inc., pf.	94¾	94	94
Ruberoid Co.	22	19½	22
Scott Paper Co.	50½	50	50
Scott Paper Co., pf.	114	113	114
Sutherland Paper Co.	27½	25¾	27½
Union Bag & Paper Corp.	12½	11½	12½
United Paperboard Co.	6¾	6	6¾
U. S. Gypsum Co.	85⅞	79¼	84¾
U. S. Gypsum Co., pf.	165	160	165

New York Curb Exchange

High, Low and Last for the Week Ending October 25, 1939

	High	Low	Last
American Box Board Co.	8	7½	7½
Brown Co., pf.	24½	23¾	24½
Great Northern Paper	42	41¼	42
St. Regis Paper Co.	3⅝	3⅜	3⅜
St. Regis Paper Co., pf.	57	56	56
Taggart Corp.	4⅝	4¼	4⅜

Kimberly-Clark Profit Doubled

[FROM OUR REGULAR CORRESPONDENT]

NEENAH, Wis., October 23, 1939—Net profits of Kimberly-Clark Corporation during the third quarter ending September 30 were more than double those of the corresponding period for the previous year. The net was $311,464, as compared with $150,644 during the same quarter in 1938.

Earnings were equal to 64 cents per common share, as compared with 31 cents in the same 1938 quarter and 66 cents in the similar 1937 quarter.

In the twelve months ending September 30, the net profit on common stock increased $328,159, the profit amounting to $1,710,070 or $3.50 per share, as compared with $1,381,911 of $2.83 per share in the previous 12-month period.

Net sales in the third quarter amounted to $6,534,634 against $6,214,925 in the same 1938 quarter, an increase of $319,709, while cost of sales was boosted $105,417, the cost amounting to $5,254,701. Gross profit totalled $1,279,933, an increase of $211,293.

Net sales in the 12-month period ending September 30, 1939 increased $947,414, the sales amounting to $27,414,199, while cost of sales amounted to $22,078,349. Gross profit increased $484,423, the profit totalling $5,335,850 against $4,851,427. Net sales during the previous 12-month period were $26,466,785.

RFC Loan to Brown Co.

The Brown Pulp and Paper Company of Berlin, N. H., received approval of a $10,000,000 loan from the Reconstruction Finance Corporation today in what was the largest loan ever granted by the Federal agency to a single borrower.

The company which has been in reorganization three years will receive the money, it was announced, upon meeting certain undisclosed conditions which were described as merely routine.

John J. Haggerty, manager of the R F C office in Boston, expressed the opinion that the plan behind the loan was a practical solution to the company's needs.

The original company was incorporated March 29, 1888, in Maine as the Berlin Mills Company, succeeding a business establishment in 1852. The Berlin Mills Company acquired Burgess Sulphite Fibre Company in 1908 and in 1917, the two companies merged under the present title.

Mill properties of the company are mainly in Berlin and Gorham, N. H., consisting of two paper mills, two purified cellulose fibre mills and several other plants. The company also has properties in Canada.

Container Corp. Nets $253,060

Net earnings of Container Corporation of America during the third quarter amounted to $253,060 equal to 32 cents a share on capital stock, it was announced today by Walter P. Paepcke, president.

The figure corresponds with a total of $16,145 for the same quarter last year. In commenting on the quarterly results, President Walter P. Paepcke said —"For the nine months there was an increase in the corporation's dollar volume of approximately 20 per cent. During the first six months of this year the profit margin was insignificant, as it was likewise for July. Widespread economies throughout all administrative and operating divisions, together with some increase in volume of business, produced earnings in August which, though moderate, were the best since September 1937. September 1939 results were further benefited by volume and price increases mor or less brought about as a result of European conditions.

"Since the first of this year, working capital has been increased $315,000. There has been a reduction of funded debt of $393,000 and capital expenditures aggregated $445,000."

Sutherland Nets $271,174

Sutherland Paper Company report for the September quarter a Net profit of $271,174, equal to 94 cents each on 287,000 shares of common stock. This includes $83,984, or 29 cents a share, representing receipts from a life insurance policy which are of a

non-recurring nature. This compares with net of $114,985, or 40 cents a share, earned in the September quarter of 1938, and with $143,266, or 50 cents a share, reported for the June quarter this year. Nine months to Sept. 30: Net profit, $530,093, including life insurance receipts, or $1.84 a share, compared with $506,491, or $1.76 a share, last year.

Rolland Paper Increases Dividend

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 23, 1939 — Rolland Paper Company, Limited, Montreal, has increased the dividend on the common stock from 50c to 60c per annum. A cut was made in the first quarter of this year to the 50c level, which was half the dividend rate of last year. The dividend now voted is 22c for the final quarter. In the three preceding quarters dividends were two 12c and one 13c. The company voted the regular 1½ per cent. dividend on the preferred.

U. S. Gypsum Profit $2,613,003

United States Gypsum Company and subsidiaries, for the quarter ended September 30, report a profit of $2,613,003 after taxes and charges, equal to $2.08 a share on 1,194,156 shares of common stock, compared with $1,607,725 or $1.25 a share in the third quarter a year ago and $2,127,161 or $1.67 a share in the second quarter this year. Nine months ended September 30, profit $5,730,861 or $4.46 a share, against $3,788,945 or $2.83 a share in the like period a year ago.

National Gypsum Profit $519,339

National Gypsum Company, for the quarter ended September 30, report a profit of $519,339 after taxes and charges, equal after preferred dividend requirements of 36 cents a share on 1,261,458 shares of common stock, compared with $355,505, or 22 cents a share in the September quarter a year ago and $506,506, or 35 cents a share, in the June quarter this year. Nine months ended September 30, profit $1,216,044, or 80 cents a share, against $751,008, or 41 cents a share in the first nine months of 1938.

Riordan Calls Bonds

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 23, 1939—Riordan Pulp and Paper Company, a wholly-owned subsidiary of Canadian International Paper Company, has called $86,300 of its 6% first mortgage debentures for redemption on December 31, for account of the sinking fund. Payment will be at the rate of 105 and accrued interest. With this redemption the bonded debt of Riordan will be reduced to $201,600. The issue as a whole matures on June 30, 1942.

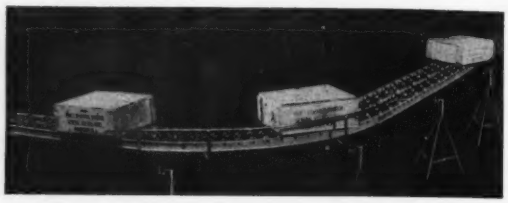
American Writing Earns $67,119

American Writing Paper Corporation, quarter ended September 30, report a profit of $67,119 after taxes and charges, compared with a loss of $55,161 in the third quarter a year ago. Nine months ended September 30, profit $103,567, against a loss of $139,917 in the like period a year ago.

Metzger Conveying Systems

Metzger wheel conveying systems, movable or fixed types, manufactured by the Metzger Company, Grand Rapids, Mich., are designed to save labor by speeding up material handling at low cost of a variety of products in manufacturing plants, warehouses and wherever a fairly uniform unit must be handled, such as boxes, cartons and cases.

The Metzger is a new type of conveyor, the portable type of which can be set up in a few minutes and hung on the wall when not in use, or the fixed type standards may be bolted to the floor for a permanent installation. Although lighter in weight, 6½ pounds per foot, this conveyor will carry a load of 700 pounds. One man can handle a 10-foot section weighing 66 pounds and can assemble 50 feet in six minutes.



METZGER WHEEL CONVEYING SYSTEMS

The gravity necessary to control the speed of travel is instantly adjusted by means of a thumb screw. The heavier the case to be handled the less elevation is required. Three feet of elevation will convey a 50-pound box 100 feet or more without any push. Straight lengths can be coupled at as much as a 40-degree angle without using a curve section.

Reliance Motors on Miniature Machine

Paper produced on a miniature paper-making machine at The Franklin Institute, Philadelphia, was turned out on a machine made by Rice, Barton & Fales, Inc., equipped with Reliance Gearmotors, manufactured by the Reliance Electric and Engineering Company, 1076 Ivanhoe road, Cleveland, Ohio.

The machine is a complete scale working paper-making unit producing paper 8½ inches wide. The entire assembly is mounted on a table 18 feet by 4 feet 6 inches. One of the power units is a Reliance Gearmotor rated ¾ h.p., 1750 r.p.m., with a reduction of 11.2:1; giving a speed of 156 r.p.m. for the output shaft. These Reliance Gearmotors are supplied with protective features to meet all conditions present in a paper mill, such as enclosed fan cooled, for use where dust conditions are bad; splash proof, for locations where there are splashing liquids and cleaning is done by hose; water-tight, force-ventilated, for d.c. machines in wet locations and humid atmosphere.

Parafine Earns $481,971

Parafine Companies, Inc., and subsidiaries, for the quarter ended September 30, report a profit of $481,971 after taxes and charges, equal to 96 cents a share on 476,062 shares of common stock, compared with $336,403, or 66 cents a share in the first quarter of the preceding fiscal year.

The Prediction of Indoor Per Cent Relative Humidities From Weather Bureau Data

By C. P. Baker[1] and H. M. Small[1]

It is generally recognized by both the manufacturer and the printer that good printing cannot be secured unless the moisture content of the paper is close to the moisture content which is in equilibrium with the atmosphere of the pressroom. When this is not the case, such common troubles as wavy edges, curling, expansion, and contraction are likely to occur. In some instances the humidity of the printing plant is controlled by air-conditioning; this prevents changes in the moisture content of the paper and minimizes the difficulties of the printer.

The paper manufacturer can assist the printer whose plant is not air-conditioned by supplying paper which has been conditioned at the mill to fit the specific needs of the customer. It is hoped that the moisture relationships, presented in this paper, will serve as a basis for estimating indoor relative humidity and enable the manufacturer to condition his paper for any locality and season of the year.

Relative and Absolute Humidity

Relative humidity refers to the percentage of water vapor in the atmosphere and may be defined as the ratio of the quantity of water vapor present in the atmosphere to the quantity which would saturate it at the existing temperature, and is, also, the ratio of the pressure of water vapor present to the pressure of saturated water vapor at the same temperature. The saturation content of the air varies with the temperature so that air containing the same quantity of water vapor will have a lower relative humidity at high temperatures than at low temperatures. The quantity known as *absolute* humidity indicates the actual amount of water vapor present per pound of dry air and is independent of the temperature.

An investigation in the heating and ventilating field *(1)* indicates that in the ordinary industrial building of the type that would house a printing plant, there are from one to three air changes per hour, due to infiltration of the outside air through cracks around the windows and the doors. This means that even in the winter, the absolute humidity of the inside atmosphere will always be very close to that of the outside atmosphere, although the relative humidities will be dissimilar because of the differences in temperature. Table I shows the average monthly humidity and temperature data obtained from a non-air-conditioned printing plant *(2)* compared with outdoor data taken at the same time by the Weather Bureau *(3)*. Fig. 1 is a plot of the indoor and outdoor absolute humidities and shows the relationship between the two.

Outdoor and Indoor Relative Humidity Determination

This interdependence of indoor and outdoor conditions gives the manufacturer a basis for estimating probable indoor relative humidities. To do this, it is first necessary to obtain representative outdoor figures by averaging the mean monthly relative humidities and temperatures obtained from the Weather Bureau for a period of at least five years.

TABLE I—COMPARISON OF INDOOR MOISTURE CONDITIONS IN A NON-AIR-CONDITIONED PRINTING PLANT WITH OUTDOOR DATA RECORDED AT THE SAME TIME *(2) (3)*

Year 1937	Average outdoor temperature deg. F.	Average outdoor relative humidity per cent	Average outdoor absolute humidity grains moisture per pound dry air
January	38.1	70.4	24
February	34.3	64.2	19
March	35.4	58.3	17
April	45.1	68.9	30
May	59.5	67.0	50
June	65.3	77.3	70
July	73.1	70.2	85
August	73.6	77.9	96
September	62.1	75.9	62
October	52.9	69.5	41
November	44.3	66.4	28
December	31.3	66.4	17

Year 1937	Average indoor temeprature deg. F.	Average indoor relative humidity per cent	Average indoor absolute humidity grains moisture per pound dry air
January	66.5	27.8	28
February	66.9	20.1	22
March	63.9	23.0	20
April	67.9	42.7	40
May	73.4	47.4	56
June	77.6	55.7	76
July	80.4	58.7	86
August	82.2	66.3	104
September	72.1	53.8	63
October	63.6	40.0	45
November	58.2	44.3	31
December	58.0	32.0	22

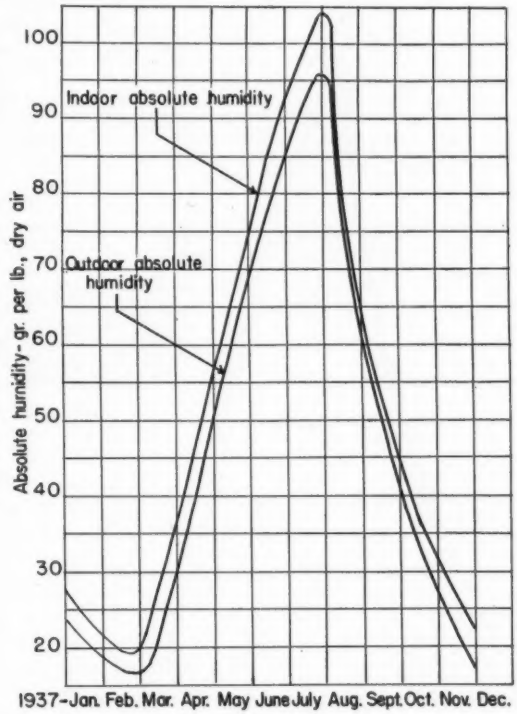


FIG. 1.

[1] Northeastern University, Boston, Mass.

It is recommended that the figures recorded at twelve o'clock noon be used, this hour being midway in the normal working day.

Table II shows such data obtained from the Weather Bureau at Boston, Massachusetts. From these figures, the actual amount of water vapor present in the atmosphere, or the absolute humidity, may be found, and, by correlating this with the probable temperature of the pressroom, the indoor relative humidity may be obtained.

The conversion of outdoor to indoor relative humidity may be accomplished by means of a psychrometric chart. A much simpler method however is by use of the alignment chart in Fig. 2. To use this chart, the temperature and the humidity for the desired month are pointed off on the first and second lines, respectively. A straight line is drawn between these two points and extended until it meets the absolute humidity scale. Between this point and the probable indoor temperature of the printing plant, another line is drawn. Where the extension of this line meets the indoor relative humidity scale, the percentage may be read.

Factors Which Affect Indoor Relative Humidity

The relative humidity obtained by this method is likely to be a little lower than the actual relative humidity because of other affecting factors. Any free liquid surfaces that are exposed to the pressroom atmosphere tend to raise the relative humidity. Because of this, the equilibrium moisture content of the paper corresponding to the estimated humidity should be the minimum amount of moisture the sheet should contain on delivery.

It must be borne in mind that moisture conditions vary with different localities and the data in Table II applies only to Boston and vicinity. To find the indoor relative humidities for other sections of the country, it is necessary to compile data similar to that in Table II from the Weather Bureau in question. These figures may then be converted to indoor conditions by the use of Figure 2.

TABLE II—AVERAGE TEMPERATURES AND RELATIVE HUMIDITIES AT NOON 1934-5-6-7-8 AT BOSTON, MASSACHUSETTS

	Temperature deg. F.	Relative humidity per cent
January	30.1	63.3
February	28.2	56.2
March	41.0	51.3
April	50.4	57.3
May	62.8	49.7
June	70.7	62.1
July	77.2	58.9
August	75.2	55.9
September	68.1	67.6
October	57.2	58.4
November	48.0	64.7
December	32.2	57.7

References

(1) Allen and Walker, Heating and Air Conditioning McGraw-Hill Book Company, 1935, Pages 26-28.
(2) Indoor figures obtained from Spaulding-Moss Company, Boston, Massachusetts.
(3) Outdoor figures obtained from U. S. Department of Agriculture, Weather Bureau, Original Monthly Records of Observations at Boston, Massachusetts.

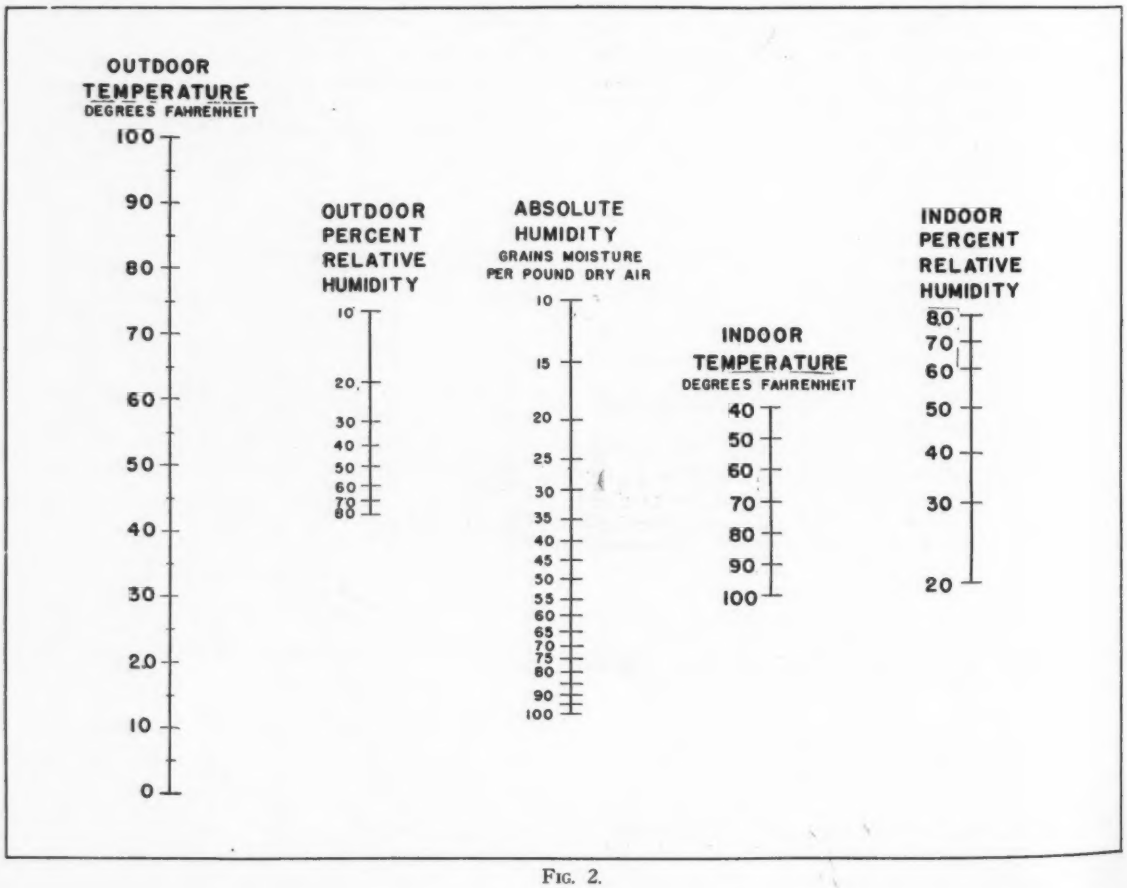


FIG. 2.

ARE **BREAKS** YOUR HEADACHE ?

Is stop-and-go running giving you the jitters? Here's how many mills have licked this expensive problem.

Some stocks are plain ornery. But, more often than not, frequent breaks at the presses are caused by top press rolls. Here's why:

Unless top press rolls have the right surface texture (and the hardness to keep it from wearing away) they have a poor affinity for water. With no water at the nip, there is a slow release, sticking, pick-ups, and, naturally, frequent breaks.

STONITE,* being a patented composite of granulated stone and ebonite, has the hardness of granite without the excess weight or the tendency to chip or crack. It carries ample water to the nip, resists doctor scoring, wears with extreme slowness and can be ground to restore the original finish when off peak efficiency.

Naturally, STONITE* improves surface finish. But it also eliminates fuzz, prevents streaks caused by scored rolls and generally improves the safety and efficiency of operation.

That's why more than 1700 STONITE* Rolls are operating in 31 countries. May we tell you more about how they will help you?

STONITE* Rolls
TOP PRESS AND SMOOTHING
* (Stonite and Granulated Stone Composite, U. S. Patent [illegible])

STOWE-WOODWARD, INC. NEWTON UPPER FALLS · MASS.

NEW YORK OFFICE · WOOLWORTH BLDG.

Stowe-Woodward Rolls are made on the West Coast by HUNTINGTON RUBBER MILLS, INC., Seattle, Washington

Makers of **WHITE STAR** *Rubber Covered Rolls,* **TANNITE** *Couch Rolls*
STONITE *Top Press and Smoothing Rolls—All by the* **COREWELD** *Process*

New England TAPPI Meets at Holyoke

The New England Section of the Technical Association of the Pulp and Paper Industry held its first meeting of the 1939-40 season aat the Roger Smith Hotel, Holyoke, Mass. on October 20, with Vincent F. Waters, technical assistant to the secretary of the Technical Association, presiding. Over 125 were present. Following the dinner, Mr. Waters, who was introduced by Miss Helen Kiely, Secretary of the New England Section, extended greetings from the national officers.

Clayton D. DeMers, Manager Industrial Sales, Taylor Instrument Companies, presented a paper entitled "Is Beating Important". Numerous tests have been made and the results of a test in a high grade bleached sulphite specialty mill indicates the wide difference in beating stock uniformly, manually. This test follows:

"The operators were instructed to adjust the roll in the usual way with a standard type *position* recorder, and our instrument was used for recording actual roll pressures during the test period. During this period no efforts were made to change the routine of beating practice, and the beaters were dumped as usual to a definite freeness.

"At the conclusion of a test of 30 beating cycles, the recorded roll pressures were plotted and the results were startling to both the operators and the plant superintendent. A difference of 4400 lb. roll pressure was shown between two consecutive beating cycles, a variation of more than 200 per cent in roll pressure, although the rolls were adjusted to the same position relative to the bed plate in each case during the entire beating cycle".

After the discussion of forces, pressures, freeness and other factors affecting the fibers in the beaters, Mr. Waters asked John Kennedy, American Writing Paper Corporation to present Norman Bearse, Technical Director, Champion International Company, who oulined the objective of the TAPPI Coating Committee's New England Section members.

Mr. Bearse stated that the mills would find it to their advantage to cooperatae in solving problems common to all paper mills and coating mills. These common problems fall into three main categories of study: practical problems; mill experiences of superintendents, machine operators and technicians; and research and devolopment.

In regard to some general interest problems in coating mills, Mr. Bearse mentioned uniformity, maximum production, use requirements, and printing quality.

The discussion considered the subjects of coating base stock; sizings used-casein, starches, synthetic resins; mechanical defects in coating paper-streaks, picking, etc.; new coating equipment; operation and results; and coating on the paper machine.

The meeting was adjourned at 11:35 P.M. because many mills are running 6 days and many had to travel long distances.

Those in Attendance

Those in attendance included: H. W. Kugler, E. O. Reed, John M. McGarry, William Glendon, H. A. Irving, L. B. Tucker, R. D. Cleveland, Kendrick Coachman, C. G. Cleverly, Jr.; John P. Kennedy, Herman Miller, A. C. Redmond, Ernest O. Nash, Carroll J. Enemark, Russell S. Bracewell, Charles M. Woodcock, Alden L. Holt, A. A. Smith, F. W. Schneider, R. E. Kilty, H. W. Schwarz, Rufus Worrell, James O'Donnell, John J. Hankard, T. J. Condon, Norman Alper, Ollie W. Messner, Frank R. Filz, Joseph J. Thomas, B. J. Mayo, Jr.; A. W. Neubauer, Chester G. Landes, Darrell D. Grant, Roger Clapp, W. F. Drake, Albert C. Lamoureux, Frank W. Durgin, T. W. Small, Jr.; L. C. Adams, E. L. Kallander, Helen U. Kiely, Lena E. Kelley, Parker B. Holden, Harry Duston, John C. Callard, C. O. Duston, Herbert S. Leonard, R. M. Leighton, Tom Kenney, Charles Horton, H. L. Mellen, W. A. Nivling, Charles P. Slocum, T. L. Stirling, W. E. Larkin, W. F. Kalloch, Herbert M. Federhen, Carroll A. Homan, William P. Stillman, L. N. Smith, H. A. Otto, Ted Zappert, J. B. Pendleton, Arthur L. Hobday, Thomas W. Hungerford, Jr.; E. E. Hazen, P. R. Nelson, W. J. Burke, L. W. Crouse, A. C. Gault, Charles Davidson, C. L. Reece, A. L. Perry, Harry Keating, E. A. Richardson, Dr. Berthold Kaufmann, Dr. Werner Kaufmann, Frank Newton, Robert Baughman, Ray K. Baker, George Berry, Leon Brown, Harry Woodin, Charles Champion, Joseph Constance, John P. Phelps, Donald Young, Edwin Bieniek, George Sullivan, Walter Cooper, Robert Burke, John Studeny, Frank Ford, R. D. McCarron, William Anderson, Sid Brown, V. F. Waters.

Philadelphia Trade Meets

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., October 23, 1939—The Wrapping Paper Division of the Philadelphia Paper Trade Association held a noonday meeting at their headquarters, 631 Drexel Building, on Wednesday, October 18. In the general discussion which took place, led by Nathaniel Saxe, vice-president in charge of Wrapping Paper, some very pertinent and timely factors relative to the new wage and hour law, Saturday closing, etc., were brought out.

The following program for the monthly luncheon meetings of the Rittenhouse Association of Paper Salesmen in Philadelphia has been announced by Hugh L. Monaghan, of Wilcox-Walter-Furlong Paper Company, in charge of publicity for the Association:

November 3, Envelope Salesmanship—Eliot Wight, United States Envelope Company.

January 5, Book Paper Selling—Summerfield Eney, Champion Paper and Fibre Company.

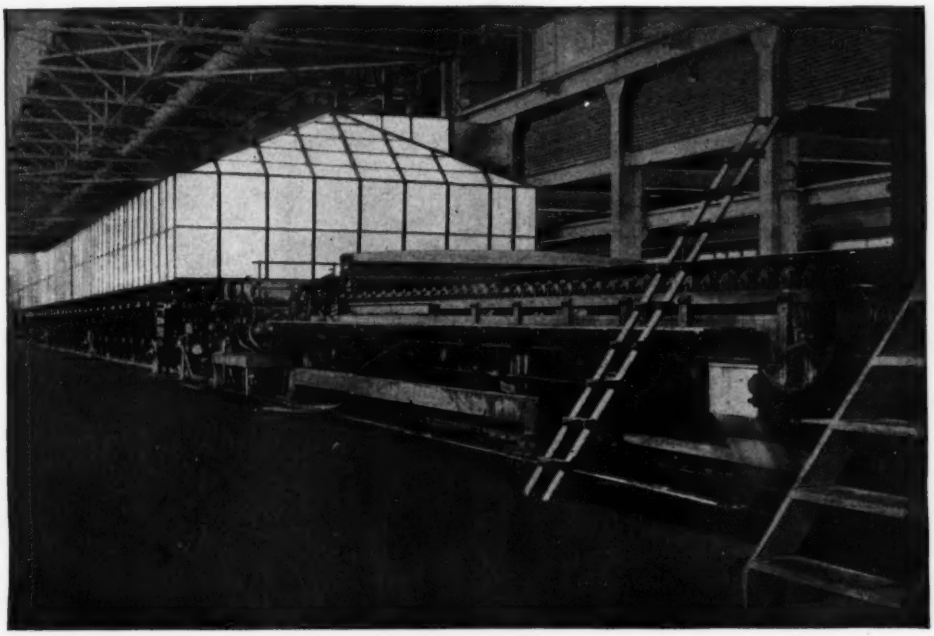
February 2, Selling of Coated Blanks—J. A. Moses, Falulah Paper Company.

March 1, Index and Bristol Selling—Sam Orton, Linton Brothers and Company.

April 5, Printing Ink and How Paper Men Can Work Together—J. R. Roberts, Charles Eneu Johnson.

As was reported in these columns a fortnight ago, invitations had been extended to executives of the local paper houses to attend the first dinner meeting of the season, held on October 9th, the purpose of which was to ascertain first hand, opinions on the current situation in the industry with suggestions for methods as to how the members could best serve their employers.

ANOTHER BELOIT MACHINE



THIS FINE PAPER MACHINE IS THE PRODUCT OF THE MODERN ENGINEERING AND MANUFACTURING FACILITIES WHICH MAKE BELOIT THE LEADER IN MEETING THE EXACTING DEMANDS OF THE PAPER INDUSTRY

THE BELOIT WAY BELOIT IRON WORKS PAPER MACHY BELOIT, WIS. U.S.A. **IS THE MODERN WAY**

Thune Automatic Dump Valve

Lately many Scandinavian mills have been installing the Thune automatic dump valve in their blow-pits, as shown in the sketch presented herewith.

The water supply pipe C has at the lower end a valve, which opens and closes the stock outlet opening in the bottom of the pit with handwheel K. Above the valve is a distribution bell with nozzles B, at the top of the pipe is another puzzle M. The pipe is

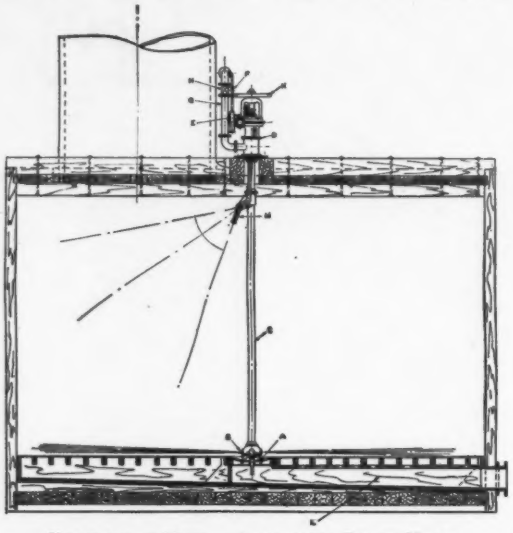


DIAGRAM OF THUNE AUTOMATIC DUMP VALVE.

rotated by a small water turbine E through a double worm gear. The turbine has a device which retards the speed when the nozzles pass the corners in a rectangular pit. One or more of these valves are installed in each pit according to the size and shape of same.

The advantages of this valve are that it saves labor and that the quantity and consistency of the stock can be regulated closely.

Further information may be obtained from Fibre Making Processes Inc., Chicago, who have the exclusive agency for U.S.A. and Canada.

Michigan Superintendents Meet

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., October 23, 1939—The Michigan Division of the American Pulp and Paper Mill Superintendents Association held their October meeting at the Park American Hotel on Thursday evening October 19 with nearly fifty attending. Following dinner, with the new chairman Lester H. LaLiberte presiding, routine business was disposed of and the speaker M. W. Phelps of the Solvay Process Company, Syracuse, N. Y., was introduced. His subjects were New Bleaching Methods of Sulphite and the Safe Handling of Chlorine Gas. His talk was most interesting and was appreciated by the superintendents and guests. Instructive discussions were much in evidence at the close of Mr. Phelp's address. Those who attended were as follows:—

M. W. Phelps Solvay Process Company, Syracuse, N. Y.; Fred Haines, Solvay Sales Corporation; Geo. H. Rice, R. B. Stewart, Al Perlick and L. H. La Liberte, Kalamazoo Vegetable Parchment Company; F. L. Zellers, Past National President, Henry Fendorf, A. W. Cole and Joe Waber, Rex Paper Company; Joseph Longhead, Longhead Company; Frank B. Eilers, Orr Felt and Blanket Company; M. S. Fogerty, W. H. Astle and R. L. Barton, Michigan Paper Company; Jack Dickson, R. T. Vanderbilt Company; C. J. McMahon, Appleton Woolen Mills; Barney Benson, Williams Gray Company; E. B. Taylor, Joe Scheuerman, Cameron Machine Company; Hod Heath, Fred Hodgemire, N. J. Cowie, and Homer E. Stafford, Hawthorne Paper Company; V. S. Denison, Beloit Iron Works; E. C. Jacobi, Sandy Hill Iron and Brass Works; A. G. Rosnes, Continental Diamond Fibre Company; Arnold Weller, W. B. Hadley, Glen Sutton, J. A. Heenan and A. L. Sherwood, Sutherland Paper Company; R. T. Washburn, F. L. Chappell, F. K. Shankweiler, Henry Reeves Jr. and Robert Buss, Hercules Powder Company; T. W. Toovey and H. G. Potter, Pennsylvania Salt Manufacturing Company; H. B. Johnston, Allied Paper Company; N. J. Berger and F. C. Stamm, Armstrong Machine Works; O. F. Fischer and R. Smith, Bryant Paper Company; W. S. Taylor and G. R. Verdon, American Cyanamid and Chemical Corporation; Willard Barnhart and W. R. Tobin, American Box Board Company.

A Correction

It was stated in last week's issue that "former Governor Joseph B. Ely last week was named a trustee to assist in the liquidation of the International Paper and Power Company succeeding Redfield Proctor, former Governor of Vermont, who resigned because of ill health." This was misleading as may be seen from the official release on the matter which is as follows:—"Irwin L. Moore, president of International Hydro-Electric System, announced that former governor of Massachusetts Joseph B. Ely has been elected a director of International Hydro-Electric System, succeeding Redfield Proctor, former governor of Vermont, who has resigned because of ill health. Governor Ely has also succeeded Governor Proctor as one of the three trustees to whom the Class B and Common shares of International Hydro-Electric System, formerly held by International Paper and Power Company, have been transferred. These trustees were appointed under a plan which divorced International Paper and Power Company from control of any public utility operating companies and contemplates the sale of its interests in such companies."

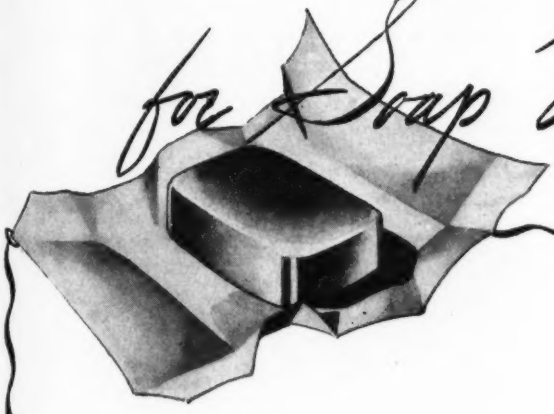
German Pulp Production

German production of mechanical pulp totaled 655,079 metric tons during the first half of 1939 of which 4,228 metric tons were exported, according to a report from the American Commercial Attache at Berlin made public by the Department of Commerce today.

Production figures on chemical wood pulp are not yet available for the first half of the current year, but exports of 102,379 metric tons far exceeded imports which totaled 40,291 metric tons.

All paper production, including newsprint, amounted to 1,565,156 metric tons during the six months of which 179,305 metric tons were exported. Only 2,030 metric tons were imported.

Du Pont Dyes for Soap Wrappers—



The use of color in merchandising is steadily increasing. Packages are designed from the standpoint of attractiveness, utility and serviceability. For COLORED soap wrappers, a wide range of shades may be obtained by the use of a selected group of Du Pont colors. The dyes listed are rated from good to excellent in light fastness. They are as well qualified to meet the alkali fastness requirements currently imposed by the trade as may be expected of any coloring material.

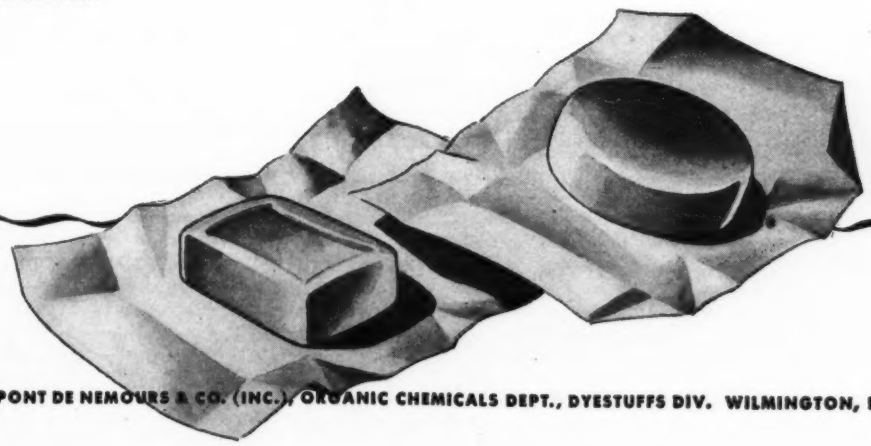
PONTAMINE* Fast Yellow BBL
PONTAMINE Fast Yellow NNL
PONTAMINE Yellow CH Concentrated
PONTAMINE Fast Orange WS
PONTAMINE Fast Scarlet 4BS
MONASTRAL* Fast Blue BWD

Where a wrapper should be WHITE, color is also necessary—color which will give bright whites and not be destroyed by alkali. Few, if any, UNCOLORED papers will undergo drastic alkali treatment without noticeable yellowing.

PONSOL*Violet RRP Powder **PONSOL Blue RP Triple Powder**

are two dispersed anthraquinone type vat colors particularly recommended for tinting because of their outstanding fastness to light, acid, alkali and chlorine.

*REG. U. S. PAT. OFF.



DU PONT DYESTUFFS

E. I. DU PONT DE NEMOURS & CO. (INC.), ORGANIC CHEMICALS DEPT., DYESTUFFS DIV. WILMINGTON, DEL.

Forest Industries Conference

WASHINGTON, D. C., October 25, 1939—The Department of Commerce will follow with particular interest the development of the recently organized Forest Industries Conference, an interdepartmental-interindustry undertaking that has for its basic purpose correlated assistance in the sound economic development of forest products industries in the United States. The Conference program is closely coordinated with the work of the Forest Products Division, of the Bureau of Foreign and Domestic Commerce, in behalf of the forest industries.

The Forest Products Division, headed by Phillips A. Hayward, who is secretary of the Forest Industries Conference, is primarily concerned with the development and expansion of the domestic and foreign field for forest products. A Conference of this nature, is unusual in that it is the first attempt to bring together periodically the representatives of government agencies concerned with the problems of forestry and forest industries and representatives of those industries.

This cooperative effort should do much to clarify existing problems in the forest products industries to the end that new industrial outlets for forest products may be obtained. It will also furnish the industries an opportunity to present their viewpoints, both as they involve the development of industry and its relation to forestry and as they involve the Governmental action in related fields.

In addition to Mr. Hayward, the Department of Commerce is represented in the Forest Industries Conference by Ernest A. Tupper, chief statistician of the Bureau of Foreign and Domestic Commerce.

Karl Freund Goes With Goodrich Co.

Karl Freund has been appointed sales engineer in the paper mill sales division of the B. F. Goodrich Company, it is announced by E. Peterson, manager of paper mill sales.

Mr. Freund has been with the Goodrich company for the last 10 years, following his graduation in mechanical engineering from Akron university. He had also been a student for three years in the Colorado School of Mines.

Mr. Freund entered the machine development department at Goodrich and was there for a year until his transfer to the post of sales engineer on cutless bearings. He remained in that capacity for two years and was then transferred to the chemical sales division of the company, where he served for seven years previous to his present appointment.

In making the announcement Mr. Peterson pointed out that the addition of Mr. Freund to his staff will make possible the furnishing of sales engineering counsel on a wider variety of rubber application problems.

Discuss Executive Control

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 23, 1939—Executive control was the subject of discussion at a luncheon meeting of the Wrapping Paper Division of the New England Paper Merchants Association, held Thursday at the Boston Chamber of Commerce. John F. Blackman, vice-president of the association in charge of the Wrapping Paper Division, presided.

Japan Consumes Less Pulp

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 25, 1939—The consumption of wood pulp in the Japanese Empire is estimated to have amounted to 1,271,253 long tons during 1938, a decline of 43,946 tons of 3.2 per cent compared with the previous year. This adverse trend was entirely the result of restrictions placed on the use of paper pulp, the consumption of which dropped from an estimated 1,038,074 long tons in 1937, to 945,166 tons in 1938.

No official or trade figures are available on paper pulp consumption during the past 2 years, but it is possible to estimate the total consumption of this type of pulp by using the known consumption figures of the Japan Paper Manufacturers' Association. During the years 1934-1936 paper pulp consumption by the members of this association amounted to 88.7 per cent, 88.1 per cent, and 87.7 per cent respectively of the total paper pulp consumption which was reported by the Forest Bureau of the Department of Agriculture and Forestry. In estimating the total paper pulp consumption for the years 1937 and 1938, it has been assumed that the consumption by the members of Japan Paper Manufacturers' Association has represented 87.0 per cent and 86.0 per cent respectively of the total amount which was used during those years. On this basis, paper pulp consumption has been estimated at 1,038,074 long tons for 1937 and 945,166 long tons for 1938.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 25, 1939—The Government Printing Office has received the following bids for 14,800 pounds (100,000 sheets) of 50 per cent rag, 26 x 38 lithograph finish map paper; R. P. Andrews Paper Company, 11.95 cents; Barton, Duer & Koch Paper Company, 10.45 cents; Graham Paper Company, 15 cents; Mudge Paper Company, 10.57 cents; Whitaker Paper Company, 10.51 cents; Paper Corp. of U. S., 12.93 cents; Butler Company, 14.45 cents; and Walker, Goulard Plehn Company, 10.94 cents.

For 9,514 pounds (67,000 sheets) of 25 x 38 white M.F. book paper; Mudge Paper Company, 5.54 cents; John F. Post, Inc., 5.65 cents; Cauthorne Paper Company, 5.65 cents; and Stanford Paper Company, 5.82 cents.

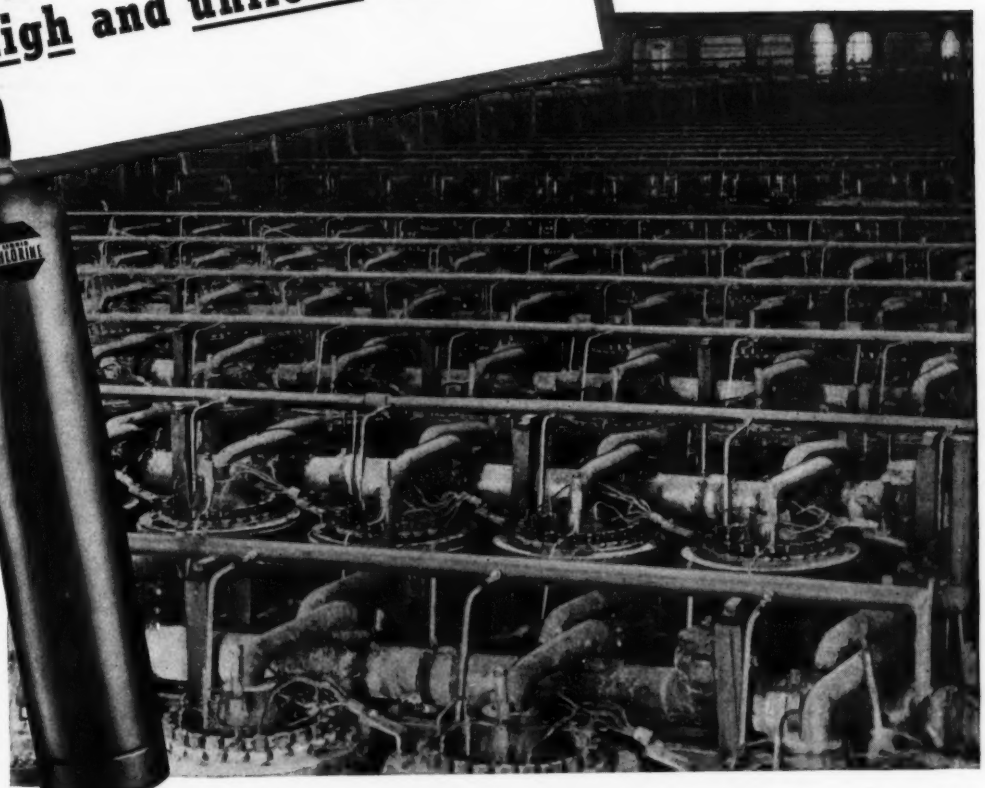
For 80,000 pounds of newsprint paper in 31 inch rolls; Paper Corporation of U. S., 3.4 cents.

For 6,250 pounds (50,000 sheets) of 50 per cent rag, 20 x 25 blue antique cover paper; R. P. Andrews Paper Company, 10.49 cents; Mudge Paper Company, 9.48 cents; Barton, Duer & Koch Paper Company, 11.95 cents; Whitaker Paper Company, 10.94 cents; and Stanford Paper Company, 12 cents.

Strathmore Bond and Cover

WEST SPRINGFIELD, Mass., October 23, 1939—The Strathmore Paper Company has distributed to representatives of the concern among the paper merchants specimens of Commercial Strathmore Bond and also specimens of Strathmore Cover. The Strathmore Bond samples are in a portfolio, which contains correspondence paper of various kinds, both white and in colors and also envelopes.

Liquid Chlorine
of high and uniform quality



Some of this Company's facilities for producing liquid chlorine. View in the cell room of the Pennsylvania Salt plant at Wyandotte.

A few of the Pennsylvania Salt Manufacturing Company Chemical Products:

CHLORINE
CAUSTIC SODA
ALUM
PERCHLORON
SODA ASH
ACID-PROOF CEMENTS
SODIUM ALUMINATE
AMMONIA
BLEACHING POWDER

Pulp mills and paper manufacturers from coast to coast, know Pennsylvania Salt liquid chlorine as a pure and dependable product that makes an important contribution to the smooth operation of their plants.

Many of the industry's leaders rely in whole or in part on this Company for liquid chlorine. Our facilities, therefore, are large, and we are able to supply your needs.

Your order is given prompt attention and is carefully followed through until the shipment reaches your plant.

Pennsylvania Salt Manufacturing Company, Widener Building, Philadelphia, Pa.
New York · Chicago · St. Louis · Pittsburgh · Tacoma · Wyandotte

PENNSYLVANIA SALT MANUFACTURING COMPANY
Chemicals

Southern Paper Club Meets

The Southern States Pulp and Paper Club met at the Fort Sumpter Hotel, Charleston, S. C., on Saturday, October 21, 1939. About 70 attended. D. G. Moon, Consulting Engineer, Savannah, Ga., presided as chairman.

A tour of inspection was made on Saturday morning of the mill of the West Virginia Pulp and Paper Company. This was followed by a group luncheon, at which the principal speaker was F. H. McDonald, Industrial Engineer of the South Carolina Public Service Authority, who described the new Santee-Cooper Project wherein these two rivers are to be dammed to produce a water and power source for industrial and domestic use. It is expected that the project will produce power at 40 per cent below the current South Carolina rate.

Mr. Moon announced the results of the mail election ballot in which R. H. Laftman, General Manager of the National Container Company, Jacksonville, Fla., was elected Chairman; W. F. Allen, Technical Director of the Herty Foundation Laboratory, Savannah, Vice Chairman and O. W. A. Rodowski, Chief Chemist of the Union Bag and Paper Company, Savannah, Secretary-Treasurer.

Although no formal papers were presented, an interesting discussion took place led by John H. Noble of the Improved Paper Machinery Company, Nashua, N. H., and John D. Rue of the Hooker Electrochemical Company.

A banquet followed in the evening at which there was a pleasant musical entertainment and a talk on Charleston's history by Homer Pace of the Charleston Chamber of Commerce.

Assisting W. F. Allen as chairman of the meeting committee were G. A. Ritter, Ted Wegener, E. T. Anderton, O. W. A. Rodowski, J. Elrod, B. B. Horres and H. D. Jones.

Those present included: A. R. Carrick, S. P. Robinson, G. K. Singletary, J. W. Wilson, L. A. Thompson, F. E. Lawrence, B. B. Horres, H. A. Murchison, Eskel Nordell, Carl Anchor, W. C. Henry, A. O. Mortenson, H. Duncan Jones, Jack Hayes, Jr.; Frank McCall, Mrs. Frank McCall, R. G. Macdonald, Mrs. Lucy Chambers, J. H. Noble, Tucker McCravy, J. H. Saile, Miss Hammond, L. L. Clapp, O. M. Bridges, Olin Sanders, D. J. Czarnecki, John S. Cator, J. L. Elrod, G. W. Craigie, Charles Fram, Eric Zimmerman, John D. Rue, Mrs. John D. Rue, O. W. A. Rodowski, Mrs. O. W. A. Rodowski, Miss Lorrain Hasselly, A. P. Rudder, W. F. Allen, Mrs. W. F. Allen, G. T. Wegner, H. F. McLeroy, Mrs. H. F. McLeroy, H. F. Hawes, R. H. Stevens, Chas. E. Richheimer, D. G. Moon.

Mexican Paper Man Visits New York

Jose de la Macorra, general manager and director of San Rafael y Anexas, S. A.—Compania de las Fabricas de Papel, of Mexico, was a recent visitor in New York and also visited friends and business acquaintances in New England. While here Mr. Macorra visited his son who is a student at the Massachusetts Institute of Technology.

The company with which Mr. Macorra is associated is the largest producer of newsprint, book, bond, coated and other grades of paper in Mexico, the two mills of the company being equipped with ten paper machines.

High Temperature Electrode Assemblies For pH Determination

An important new development in the pH field has been announced by the National Technical Labratories, 3330 E. Colorado street, Pasadena, Cal., which, after an extensive period of research work, has perfected a High Temperature Glass Electrode Assembly for use with the Beckman Industrial pH Indicator and also with the Beckman Industrial pH Meter. This electrode assembly can be used continuously at temperatures of 122 deg. to 212 deg. F. (50 deg. to 100 deg. C.) and, like other Beckman Electrode Assemblies, it is completely shielded so that it can be installed directly in tanks and grounded flow lines without stray current effects.

The unusually high temperature range of this new electrode assembly has been made possible by considerable research work in which an entirely new type of electrode glass was perfected. The assembly has been completely tested and proved in actual plant installations under a wide variety of operating conditions.

The assembly consists of three units—the Glass Electrode, the Calomel Electrode, and the Temperature Compensating Tube—all mounted in a corrosion resisting porcelain enameled Flow Chamber. The units are especially designed for convenient servicing under high temperature operations. Ten foot shielded leads are regularly supplied with the assembly but lengths up to 500 feet can be supplied on special order.

Complete information on this new Beckman development can be obtained by writing direct to the National Technical Laboratories, 3330 E. Colorado street, Pasadena, Cal.

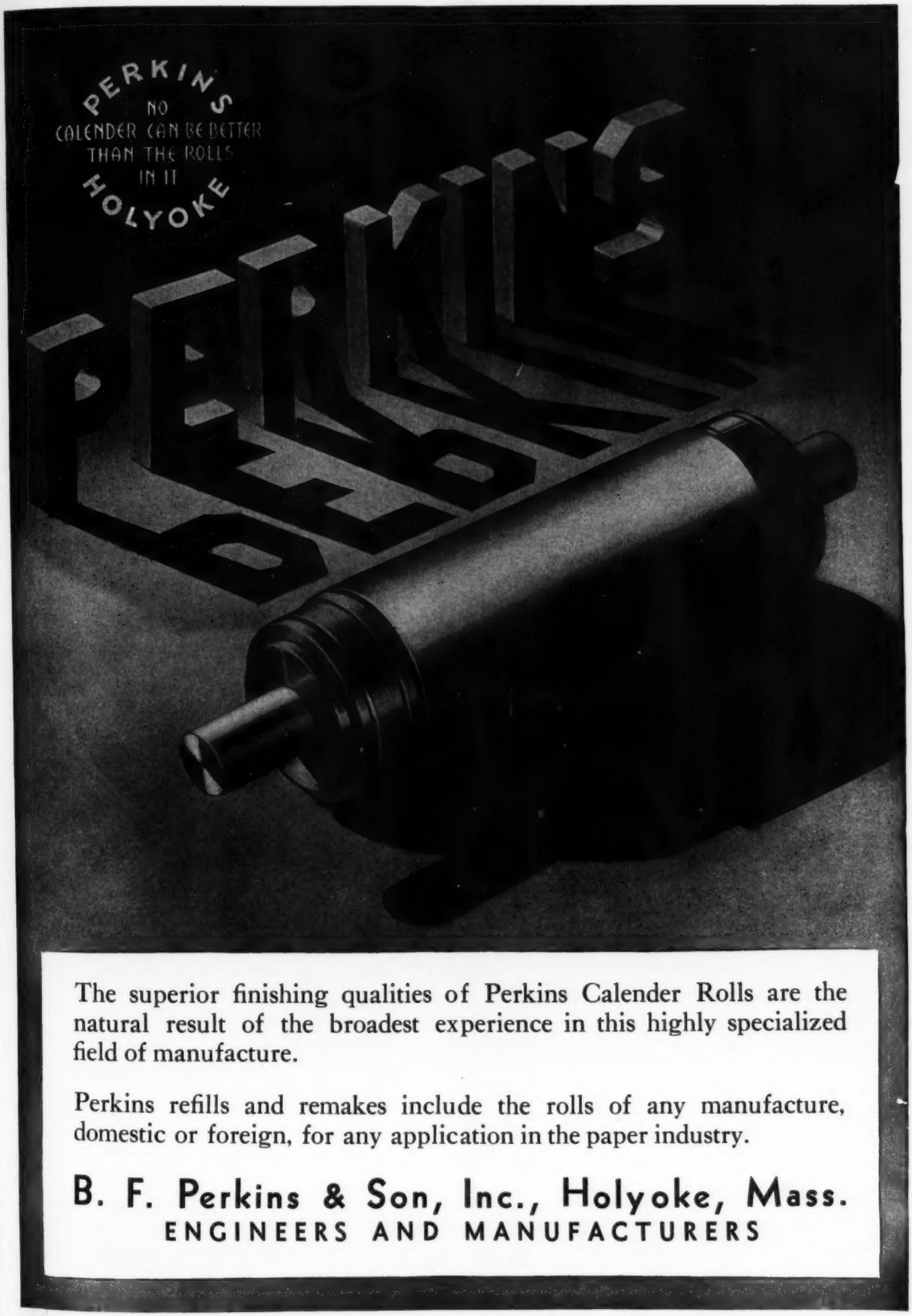
Paperboard Association To Meet

The annual meeting of the National Paperboard Association will be held at the Waldorf-Astoria Hotel, New York City, on Wednesday, November 15, and Thursday, November 16, 1939. An interesting program is being prepared, which will include a report by President Henry D. Schmidt, reviewing "Association Activities."

At this meeting, officers will be elected to serve during the ensuing year.

Offset and Gravure Processes

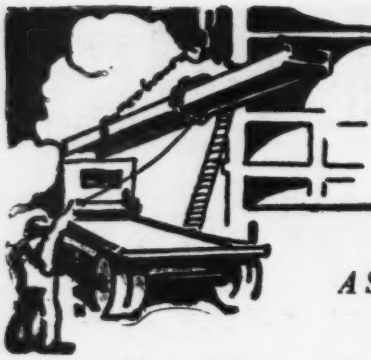
The Graphic Arts Division of the American Society of Mechanical Engineers will meet in Room 1101, Engineering Societies Building, 29 West 39th street, New York, N. Y. on Tuesday, October 31 at 7:30 P.M. W. C. Huebner of the Huebner Laboratories, New York City will speak on "Offset and Gravure Products and Methods of Reproduction Employed" and illustrate his talk with a number of new products. R. G. Macdonald, secretary of TAPPI will preside as Chairman.



The superior finishing qualities of Perkins Calender Rolls are the natural result of the broadest experience in this highly specialized field of manufacture.

Perkins refills and remakes include the rolls of any manufacture, domestic or foreign, for any application in the paper industry.

B. F. Perkins & Son, Inc., Holyoke, Mass.
ENGINEERS AND MANUFACTURERS



CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Windsor, Conn.—Stevens Paper Mills, Inc., manufacturer of press board, insulating board and other paper board stocks, has approved plans for new one-story addition to mill, 87 x 170 feet, to be used for expansion in machine division, drying department, and storage and distributing departments. Cost estimated over $60,000, including equipment. Erection contract has been let to R. J. Jones Company, 15 Lewis street, Hartford, Conn., and work will be placed under way at once.

Plymouth, N. C.—The North Carolina Pulp Company, manufacturer of sulphite fiber products, has completed plans for new one-story addition to mill for increased production. Contract for structural steel framing, totaling about 1300 tons, has been awarded to Bethlehem Steel Company, South Bethlehem, Pa., and work will be placed under way at early date. Cost reported over $100,000, with equipment. Company is a division of Kieckhefer Container Company, Delair, N. J.

Los Angeles, Cal.—The Southland Paper Converting Company, care of Donald E. Gault, 335 Rowan Building, attorney and representative, recently organized with capital of $25,000, plans early operation of local plant for the manufacture of a line of paper products. Incorporators of new company include Stanley G. Young and Walter K. Reeve.

Chicago, Ill.—J. Chukerman & Sons, 2440 West Lake street, wholesale commercial paper products, have awarded general contract to Morris Handler, 2720 West Chicago avenue, for remodeling and improving three-story and basement building, 200 x 212 feet, at Canalport avenue and 21st street, recently acquired from the Goldenrod Ice Cream Company, as noted in these columns. It will be used for a new storage and distributing plant, including company offices and headquarters, providing large increase in present capacity. Work is scheduled to be placed under way at once. As soon as structure is ready for occupancy, company will remove present plant to new location.

St. Louis, Mo.—The Loy-Lange Box Company, 222 Russell street, manufacturer of corrugated boxes and containers, fiber boxes, etc., has approved plans for one-story addition to plant, 45 x 166 feet, to be used primarily for storage and distributing service. Cost reported close to $45,000, with equipment. General erection contract has been awarded to the Robert Paulus Construction Company, 2205 Ann avenue, St. Louis, and work will be placed in progress at once.

Housatonic, Mass.—The Rising Paper Company, manufacturer of writing paper stocks, has begun erection of new addition to mill, recently referred to in these columns, consisting of a two-story structure, about 40 x 80 feet, estimated to cost close to $45,000, with equipment. Ernest F. Carlson, Inc., 1694 Main street, Springfield, Mass., has the erection contract.

Kalamazoo, Mich.—The Bryant Paper Company, manufacturer of book, catalog and other paper stocks, has advanced production at mill, placing a paper machine in operation which has been idle for about two years. It is stated that the mill is now on the highest production level since 1937, with employment of about 900 persons in different divisions. It is expected to hold to present output basis for an indefinite period.

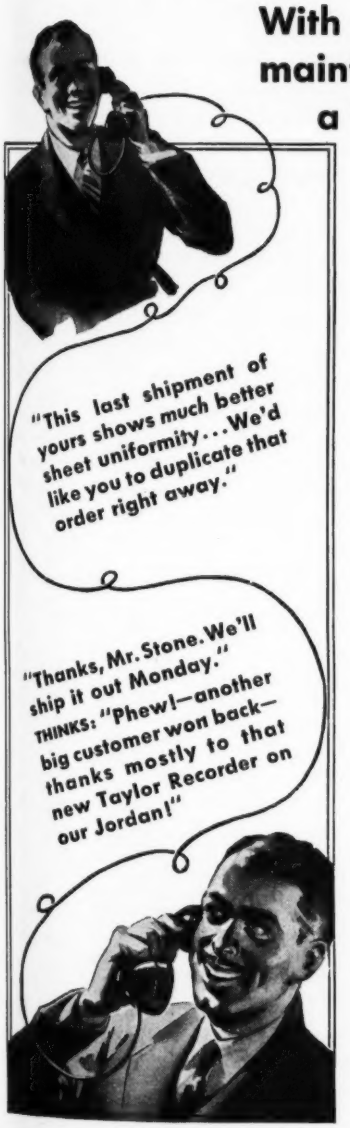
St. Louis, Mo.—The Moser Paper Box Company, 200 Elm street, manufacturer of stiff paper boxes and containers, has completed plans for new one-story addition, 41 x 83 feet, to be used for general operating service, including garage facilities. Company also will make improvements and alterations in present building.

Pearisburg, Va.—The Celanese Corporation of America, Inc., 180 Madison avenue, New York, N. Y., manufacturer of cellulose rayon products, is reported planning enlargements in new mill now in course of erection at Pearisburg, to comprise several new production units and corresponding expansion in other operating departments, providing about 50 per cent increase over initial capacity. Project is stated to cost over $4,000,000. Company has active construction in progress on main units, power plant and other buildings at this new mill site, with completion scheduled early in 1940. The Hughes-Foulkrod Company, Schaff Building, Philadelphia, Pa., is general contractor for the erection, as previously noted in these columns. Present plant will represent a reported investment in excess of $5,000,000, including equipment.

Pensacola, Fla.—The Florida Pulp and Paper Company, Pensacola, recently organized by J. C. and A. D. Pace, Pensacola, and James H. Allen, Savannah, Ga., formerly vice-president of the Union Bag and Paper Corporation, New York, N. Y., with mill at Savannah, has concluded negotiations with city officials at Pensacola, for site for proposed new pulp and paper mill, to be occupied under lease. As previously noted in these columns, new mill will specialize in the production of bond, book and other white paper stocks, and is reported to cost in excess of $1,000,000. The city has agreed to expend about $50,000 for preparation of mill site, with work to begin at early date. Erection of new mill is scheduled to proceed shortly after the turn of 1940.

REDUCE JORDAN PLUG PROCESSING TROUBLES THIS EASY WAY!

With normal variations in consistency you can maintain correct plug pressure with the aid of a Taylor Jordan Plug Pressure Recorder!


"This last shipment of yours shows much better sheet uniformity...We'd like you to duplicate that order right away."
"Thanks, Mr. Stone. We'll ship it out Monday."
THINKS: "Phew!—another big customer won back—thanks mostly to that new Taylor Recorder on our Jordan!"

Is your mill without a Jordan head box to control stock flow... or without careful stock consistency control? Then you know what a headache it is to get uniform stock for your machine. And you realize how much time, trouble, and money *you could save* with *close*, really accurate regulation of your Jordan plug pressure.

So here's good news: With a Taylor Pressure Recorder accurately recording minute-by-minute pressure on your Jordan, your troubles are over! That's because then your operator can easily maintain plug pressures to suit variations in consistency—simply by adjusting the plug pressure to meet the changes in either stock flow or consistency. And the result? You get a far more uniformly cut and brushed stock. And that means you get a more uniform salable sheet—with half the trouble and expense!

This Taylor Pressure Recorder is economical to buy. It can be installed on all types and makes of Jordans. And, mills report that it's surprisingly quick to pay for itself ... by saving time and making possible a more *salable* paper. And once its initial cost is written off, each year's savings is money in your company's pocket!

It can pay you to let a Taylor representative give you more facts about Jordan plug pressure control... and about the many other processes throughout a modern mill that can profitably take advantage of this money-saving Taylor Control. Write today. There's no obligation. Address: Taylor Instrument Companies, Rochester, N.Y. Plant also in Toronto, Canada. Manufacturers in Great Britain: Short & Mason, Ltd., London, England.

Modern Mills Save Money with these Taylor Systems:

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PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger
EDITOR

Ronald G. Macdonald
Editor Technical Section

Lynne M. Lamm
Washington Correspondent

Vol. 109 New York, October 26, 1939 No. 17

COMING EVENTS IN PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

PAPER INDUSTRY EXPANDS

With the latest figures showing the valuation of the total physical assets of the United States at $409,949,000,000 and a late report of the Department of Commerce indicating that income payments to individuals in this country are at the rate of more than 68 million dollars, the current production and sales of paper continue at a very high level. The improved showing of the paper industry during the first half of this year was confined largely to physical volume. Production held steadily above the 1938 level, scoring a total increase of 19 per cent for the full six months. Prices failed to recover, however, and at the end of June were still approximately 10 per cent under the average in early 1938. For the half year, the improvement in manufacturers' dollar volume of sales amounted to 5 to 10 per cent, the increase in profits, compared with the relatively low earnings of 1938, adding up to 25 to 35 per cent. These were some of the developments in the paper industry disclosed in a recent survey by Dun & Bradstreet, Inc.

Entering the Summer period with inventories in the hands of wholesalers approximately the same as in the previous year and manufacturers' holdings well under that level, the industry looked forward to a further moderate upturn in business during the remainder of the year, the survey continues. Buying policies remained cautious during July and August and prices held comparatively unchanged. Operating rates responded to the normal seasonal expansion in sales and expanded gradually.

The outbreak of hostilities in Europe changed the picture overnight. The threatened restriction of foreign supplies of pulp and the prospect of higher prices on all paper products caused a rush of orders from converters and distributors which exceeded manufacturers' capacity for deliveries. Fearful that the market might get out of hand, mills withdrew prices on some products, discouraging excessive speculative orders. Changes were occurring too rapidly to allow an accurate appraisal, but for the most part paper makers found earnings at the end of September considerably improved. Offsetting the higher costs of supplies and the advance in minimum hourly wages scheduled for October 15 were the strengthening of selling prices and the savings on operating costs resulting from near-capacity schedules.

Reflecting the sharp increase in sales during September, production moved higher in all major divisions of the industry. By the end of the month, the operating rate for mills other than those producing paperboard and newsprint was up to 94.6 per cent of capacity. According to reports of the American Paper and Pulp Association, the opening rate for the first thirty-nine weeks of the year averaged 81.4 per cent—against 70.1 per cent in the corresponding period of 1938, and 86.9 per cent in 1937.

The paperboard division, which is the largest of any in respect to tonnage, went to 82 per cent of capacity in the week of September 30, exceeding all levels since the Spring of 1937.

According to statistics compiled by the National Paperboard Association and the U. S. Bureau of Census, production in this division in the period January through August amounted to 3,018,869 short tons, averaging 67.4 per cent of capacity, compared with 59.1 per cent in the 1938 period and 84.1 per cent in 1937.

Newsprint production in Canada and the United States totalled 330,539 tons in September, or 13,564 more than in the preceding month, News Print Service Bureau reports. Compared with 1938, output was up 10 per cent, although figures were still under the record levels of 1937 and 1936. In the first nine months of the year, mills in the United States showed a production gain of 19 per cent over 1938, those in Canada 8 per cent.

Trade authorities estimate that a considerable proportion of the paper orders booked in recent weeks went to inventory-building, rather than to current needs. Nevertheless, there are a number of signs pointing to a steady improvement in consumption factors. Newspaper advertising linage, which, according to *Media Records,* was 1.8 per cent higher than a year ago during the first eight months of the year, is estimated to have shown a rather substantial increase in September. At the same time, circulation figures of many leading dailies, another reliable index of the trend of newsprint demand, benefited markedly from the public interest in war developments.

The container division, more closely related than any other to the general trend of business activity,

felt the stimulus of the sharp increase in turnover of groceries, dry goods, and other light consumer goods lines. Folding paper box sales, which in August were approximately 20 per cent above 1938 and in the full period of January through August, 10 per cent higher, are reported by some manufacturing concerns to have amounted to more than double the 1938 total during September.

Following the dull price movements of the preceding twelve months, prices suddenly took the center of the stage in September. The uncertainty of pulp, casein, and other materials supplies and the higher charges involved in shipping and insurance caused a scramble to buy before finished goods quotations could be affected. Mills became fearful of a runaway market and made a concerted effort to restrict speculative purchases. In some instances, orders were booked only on condition that prices would be those pravailing at the time of delivery.

On a number of products, the effect of the heavy demand was merely to firm prices up to quoted levels. Newsprint makers announced that present lists of $50 per ton would be maintained through the first quarter of 1939. In other lines, however, the spurt in raw material costs was reflected almost immediately in sharply higher selling prices. With sulphite pulp and waste paper costs soaring, kraft board advanced to $45 a ton on contract sales and to as much as $55 on others. Kraft wrapping paper moved up to $72 to $75, compared with $65 before the war, and grocery bags made of kraft sold for $90 to $105 a ton, against $70 or less previously.

From a three-and-one-half-year low of 79.9 in July, the wholesale price index for paper and pulp, computed by the U. S. Bureau of Labor Statistics, is estimated to have recovered sharply in September to the highest level since the third quarter of 1938.

An Improved Glossmeter

Greater sensitivity, convenience, and speed for the operator, have been effected in Bausch & Lomb's Glossmeter by the introduction of a small aperture to concentrate the light, a new straight coil micro lamp, an improved rheostat and a lamphouse which makes the bulb easy to change and calibrate.

The aperture is now effectively filled by the new lamp which is easily replaced and calibrated when necessary by means of knurled screws. Formerly a change of bulb altered the position of the filament and made calibration difficult. The new lamphouse is now attached externally so that the parts may be handled with speed. Removal of a sheet metal cover exposes the socket and centering screws on the lamp base. Only minor adjustments are required in seeing that the filament completely fills the aperture with light.

A new photo-electric cell of the electro-cell type gives about three times greater output than that previously used. To avoid jumpy readings an improved rheostat is employed which gets rid of the jump in readings while the knobs are being turned.

Production Ratio Report

The statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1939	1938	1937	1936	1935	1934
January	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	82.9%	77.2%	82.9%	81.5%	70.9%	.....
September	88.9%	76.3%	78.6%	80.5%	71.9%	58.2%
October	.....	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	.....	72.3%	80.6%	81.3%	70.5%	.....
First 41 weeks	82.1%	70.7%	86.3%	79.8%	69.7%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1939		CORRESPONDING WEEKS, 1938	
September 9	74.2%	September 10	66.0%
September 16	92.0%	September 17	79.6%
September 23	93.5%	September 24	78.4%
September 30	96.2%	October 1	81.1%
October 7	93.3%	October 8	81.6%
October 14	99.3%	Octboer 15	83.0%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	Sept. 9, 1939	Sept. 16, 1939	Sept. 23, 1939	Sept. 30, 1939	Oct. 7, 1939	Oct. 14, 1939
0% to 50%	59	45	33	32	31	27
51% to 100%	242	256	267	261	258	182
Total Mills Reporting	301	301	300	293	289	209

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1935	62%	68%	68%	63%	61%	66%	62%
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1935	67%	71%	77%	71%	61%	66%
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	....	....	....	....	....

Week end. Sept. 9, 1939—63%
Week end. Sept. 16, 1939—79%
Week end. Sept. 23, 1939—80%
Week end. Sept. 30, 1939—82%
Week end. Oct. 7, 1939—84%
Week end. Oct. 14, 1939—83%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

Heads Southeastern Superintendents

A. T. Taylor of the Bedford Pulp and Paper Company, Big Island, Va., was elected president of the Southeastern Division of the American Pulp and Paper Mill Superintendents Association at its fall meeting held recently at Durham, N. C. Other officers that were elected are as follows: First vice president, A. A. Muir, Mead Corporation, Lynchburg; second vice president, William Robertson, Champion Paper and Fibre Company, Canton; secretary and treasurer, H. E. Wehr, Mead Corporation, Lynchburg.

O. J. Naughton Goes with Ecusta

O. J. Naughton, who recently resigned from the Houston Division of the Champion Paper and Fiber Company, is now with the Ecusta Paper Corporation, Pisqah Forest, N. C.

CHEMICALS

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Whatever types of paper you make, Cyanamid can supply you with the chemicals required in their production, for Cyanamid service is complete. Why not let us help you apply the right products in the right way for your requirements?

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***AEROSOL WETTING AGENTS**
DEFOAMERS
SULPHONATED OILS

and OTHER PAPER CHEMICALS

*Trade-mark of American Cyanamid & Chemical Corporation applied to wetting agents of its own manufacture.

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DISTRICT OFFICES: 89 Broad Street, Boston, Mass.; 600 S. Delaware Avenue, Philadelphia, Pa.; Russell & Bayard Streets, Baltimore, Md.; 822 W. Morehead Street, Charlotte, N. C.; 860 Leader Building, Cleveland, Ohio; 20 N. Wacker Drive, Chicago, Ill.; 2006 Race Street, Kalamazoo, Mich.

Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

United States Patents on Papermaking

Third Quarter, 1939

Compiled by Clarence J. West, Chairman, Committee on Abstracts and Bibliography, TAPPI

The following list of patents has been compiled from the current numbers of the Official Gazette of the United States Patent Office. Since, as a rule, only one claim is published in the Gazette, it is not claimed that the list is complete; it is also possible that some patents have been included which do not apply to papermaking.

Copies of any of the following patents may be obtained from the U. S. Patent Office, Washington, D. C., by sending ten cents ($0.10) for each patent desired. The number, name of inventor, and title of patent should be given in the request. Personal checks and postage stamps are not accepted. Books of coupons may be purchased for $2.00 or $10.00, good for 20 or 100 patents, respectively. Coupon orders do not have to be accompanied by letters of transmittal.

JULY 4, 1939

2,164,359. Adhesive tape. Clauss Burkart Strauch, assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn. Filed May 18, 1936. 16 claims. (Cl. 91-68). The adhesive includes a halogenated rubber plasticized by a tack-producing plasticizer, so that the adhesive is normally tacky, pressure-sensitive and cohesive.

2,164,436. Box blanking machine. Marshall A. Waters, Chicago, Ill. Filed March 31, 1938. 23 claims. (Cl. 93-58.2). A longitudinal web scoring device.

2,164,445. Paper machinery. Adam E. Bridge, assignor to The Black-Clawson Company, Hamilton, Ohio. Filed Dec. 5, 1935. 3 claims. (Cl. 285-10). A hollow rotatable drier roll with provision for condensate removal.

2,164,494. Oil, grease, and hydrocarbon resistant material. Kenneth R. Brown and Edmond H. Bucy, assignors to Atlas Powder Company, Wilmington, Del. Filed Nov. 21, 1936. 2 claims. (Cl. 91-68). A fibrous base coated first with a plasticized cellulose derivative and then with a water-miscible organic binder selected from the group consisting of protein glues and water soluble gums flexibilized with a polyhydric alcohol flexibilizer containing at least 50 per cent of sorbitol.

2,164,494. Oil, grease, and hydrocarbon resistant material. Kenneth R. Brown, assignor to Atlas Powder Company, Wilmington, Del. Filed Dec. 19, 1936. 1 claim. (Cl. 91-68). A fibrous base coated first with a plasticized cellulose derivative and then with a protein glue or water soluble gum and a flexibilizer containing at least 50 per cent of water-soluble sugar and polyhydric alcohols.

2,164,508. Method of making a siding strip. George Arthur Fasold, assignor to The Philip Carey Manufacturing Company, Lockland, Ohio. Filed Aug. 24, 1933. 3 claims. (Cl. 154-2). A method of impregnating a web material with a bituminous saturant and covering one margin with paper and the other with a granular material.

2,164,712. Shingle. Lester Kirschbraun, assignor to The Patent and Licensing Corporation, New York, N. Y. Filed Sept. 28, 1937. 2 claims. (Cl. 108-8). The shingle is comprised of a body portion of hardened plastic material and a sheet of asphalt-saturated and -coated mineral-surfaced felt.

2,164,935. Method and apparatus for forming parcel handles. Ferd H. Meyer, assignor to the Adhesive Products Company, San Francisco, Cal. Filed Aug. 2, 1937. 11 claims. (Cl. 93-1). The body member is gummed paper tape and the bail member is flexible tape.

2,164,943. Preparation of calcium carbonate. Howard Roderick, assignor to Michigan Alkali Company, Wyandotte, Mich. Filed Aug. 27, 1936. 9 claims. (Cl. 23-66). A method of making calcium carbonate of fine particle size by carbonating a solution of calcium chloride and sodium hydroxide at 85 to 100 deg. F.

2,164,944. Pulp stock agitating apparatus. John A. Rosmait, Manistee, Mich. Filed June 10, 1936. 3 claims. (Cl. 92-37). A storage chest for paper pulp.

2,165,166. Blue print coating. Garnet Philip Ham, assignor to American Cyanamid Company, New York, N. Y. Filed July 16, 1938. 6 claims. (Cl. 95-6). A light sensitive ferric salt, a soluble ferricyanide and an amidine salt.

2,165,187. Manufacturing of sodium aluminate. William S. Wilson and Alban J. Lobdell, Jr., assignors to Monsanto Chemical Company, St. Louis, Mo. Filed Dec. 26, 1935. 11 claims. (Cl. 23-52). A sodium aluminate with the Al_2O_3/Na_2O ratio of substantially 1.4, an aqueous solution of which is relatively stable.

JULY 11, 1939

2,165,210. Apparatus for coating beveled edges. Alfred W. Baldwin, assignor to Armstrong Cork Company, Manheim Township, Lancaster County, Pa. Filed Dec. 16, 1936. 2 claims. (Cl. 91-51). Apparatus for coating plane edge surfaces.

2,165,270. Cotton bleaching. Hans O. Kauffmann, assignor to Buffalo Electro-Chemical Company, Inc., Buffalo, N. Y. Filed Feb. 10, 1937. 6 claims. (Cl. 8-109). A combination of hypochlorite bleaching at pH 4.5 to 7, followed by addition of peroxide bleaching solution.

2,165,289. Machine for making wrappers. Michael J. Milmoe and Clarence J. Malhiot, assignors to F. B. Redington Company, Chicago, Ill. Filed Feb. 15, 1937. 18 claims. (Cl. 93-1). Mechanism for forming wrappers having tearing strips.

2,165,291. Method of making pyroxylin coated materials. Rowland B. Mitchell, assignor to Athol Manufacturing Company, Athol, Mass. Original application filed April 28, 1938; divided and this application filed Jan. 19, 1939. 1 claim. (Cl. 91-68). A method of applying to the surface of a base coating of dry impervious waterproof pyroxylin a liquid film containing volatile nitrocellulose non-solvent dissolved in a solution of volatile solvent and nitrocellulose, giving a superficially minutely porous dried coating.

2,165,344. Solid material from waste liquor. Henry Seymour Colton, Shaker Heights, Ohio, assignor to H. Seymour Colton, M. J. Rentschler and James A. Weeks, as trustees. Filed March 17, 1938. 18 claims. (Cl. 106-27). A plastic composition comprising largely a joint precipitate of calcium sulphate and iron hydroxide.

2,165,442. Automatic lubricant overbalance for table rolls. Earl E. Berry, assignor to Beloit Iron Works, Beloit, Wis. Filed Sept. 21, 1936. 12 claims. (Cl. 92-44). A liquid conduit for supplying a liquid between the rollers and their bearing supports, etc.

2,165,549. Paper machine suction slice. Lloyd Hornbostel, assignor to Beloit Iron Works, Beloit, Wis. Filed Nov. 29, 1935. 9 claims. (Cl. 92-49). A suction slice lip comprising a sheet of resilient material having a plurality of parallelly disposed channels extending from edge to edge thereof, and means on opposite sides of the sheet adjacent one edge providing gripping surfaces for holding the lip.

2,165,644. Method of absorbing and condensing digestion gases and vapors. Albert D. Merrill and Thomas L. Dunbar, assignors to Chemipulp Process, Inc., Watertown, N. Y. Filed June 26, 1935. 17 claims. (Cl 92-7). A method of admitting digestion gases to an eductor and contacting the gases with a plurality of streams of condensing liquid and utilizing the resulting liquid for the digestion of cellulosic material.

2,165,728. Apparatus for creping sheet material. Hermann Rosenfeld and Josef Morhard, Mannheim, Germany. Filed March 30, 1936. 12 claims. (Cl. 154-30). Apparatus for longitudinally creping a travelling web.

2,165,772. Industrial and paper-makers' felts. Patrick H. Walsh and Percival T. Gates, assignors to Drycor Felt Company, Belleville, N. J. Filed May 4, 1937. 1 claim. (Cl. 28-4). A felt with the top surface comprising a closely needled smooth fleece for carrying pulp material and a bottom surface comprising a fleece of coarser form permitting drainage from the pulp material and a wear-resisting surface for driving over pulleys.

2,165,786. Paper napkin machine. Peter J. Christman, assignor to Paper Converting Machine Company, Green Bay, Wis. Filed May 22, 1937. 20 claims. (Cl. 270-66). A web folding machine.

2,165,834. Water-resistant, starch-containing product and method. Harold E. Bode, assignor to Corn Products Refining Company, New York, N. Y. Filed Sept. 20, 1937. 6 claims. (Cl. 134-16). A mixture of dehydrated starch having adsorbed therein a water-immiscible liquid and an organic starch swelling agent.

2,165,841. Packaging machine. Ralph N. Doble, Hingham, Mass. Original application filed Oct. 19, 1937; divided and this application filed Dec. 29, 1938. 4 claims. (Cl. 93-3). A bag-forming machine.

2,165,947. Glued Jordan lining. Harold D. Stuck, assignor to John W. Bolton & Sons, Inc., Lawrence, Mass. Filed Jan. 16, 1936. 15 claims. (Cl. 92-27). A bodily transportable preassembled lining for a Jordan engine shell which consists of bent knives between which are bent separators attached to the knives by an adhesive.

2,166,038. Manufacture of board strengthened coverings. Henri Chambon, assignor to Societe Anonyme des Anciens Etablissements L. Chambon, Paris, France. Filed July 15, 1936. 12 claims. (Cl. 154-2). A machine for manufacturing cardboard covers from strips of cardboard and paper.

2,166,082. White titanium pigment and method of preparing the same. Willis F. Washburn, Roy Dahlstrom and Andrew T. McCord, assignors to National Lead Company, New York, N. Y. Filed Aug. 26, 1936. 13 claims. (Cl. 134-58). Titanium dioxide containing 0.001 to 0.04 per cent of compounds of yttrium, molybdenum, tin, antimony, etc.

JULY 18, 1939

2,166,126. Method and apparatus for assembling wrapped boxes. Herman A. Carruth, assignor to National Folding Box Company, New Haven, Conn. Filed May 25, 1938. 20 claims. (Cl. 93-40). Apparatus for making wrapped paperboard boxes from a relatively stiff body blank.

2,166,200. Apparatus for treating wood pulp or the like with chemical reagents. Carl Busch Thorne, Hawkesbury, Ontario, Canada. Filed May 12, 1938. 4 claims. (Cl. 259-95). A cylindroidal tank with a vertical pipe in the center, forming an annular chamber and a confined helical channel within the chamber and extending around the pipe, providing a long reaction zone for the pulp and reagent.

2,166,268. Apparatus for forming coated paper plates. Paul R. Simmons, Logansport, Ind., assignor to Purity Paper Products, Inc. Filed March 16, 1936. 20 claims. (Cl. 91-47). A paper plate coating apparatus.

2,166,287. Method of making paper boxes or the like with printed wrappers. Clarence Lloyd Claff, Randolph, Mass. Filed Feb. 4, 1938. 4 claims. (Cl. 93-36.6).

2,166,330. Method of bleaching. George P. Vincent, assignor to The Mathieson Alkali

Works, Inc., New York, N. Y. Filed Sept. 12, 1938. 10 claims. (Cl. 8-105). Use of chlorine and chlorine dioxide in aqueous suspension.

2,166,352. Shelf paper. Kenneth C. Hamilton, assignor to Milwaukee Lace Paper Company, Milwaukee, Wis. Filed Dec. 27, 1937. 12 claims. (Cl. 41-10).

2,166,388. Machine for combining bags and cartons. Robert Morris Bergstein, assignor to Edna May Bergstein and Robert Morris Bergstein, Cincinnati, Ohio, as trustees. Filed Dec. 20, 1937. 22 claims. (Cl. 93-36.01). A carton blank and liner assembling device.

2,166,540. Alcoholic treatment of ligneous cellulosic material. Alan J. Bailey, assignor to Regents of the University of Minnesota, Minneapolis, Minn. Filed Dec. 17, 1937. 10 claims. (Cl. 92-9). Treating wood with a water solution of a monohydroxy alcohol (such as a butyl alcohol) which is soluble in water at temperatures between 100 and 200 deg. C. and from 2 to 10 per cent of an inorganic alkali at temperatures of 100 to 200 deg. C.

2,166,737. Web splicing apparatus. Henry A. Wise Wood, assignor to Wood Newspaper Machinery Corporation, New York, N. Y. Filed Jan. 4, 1933. 17 claims. (Cl. 242-58).

2,166,749. Machine for undulatingly corrugating cardboard. Harold G. Burill, Baltimore, Md. Filed Dec. 22, 1937. 7 claims. (Cl. 154-32).

2,166,812. Process for the separation of the constituents of organic mixtures containing both resin acids and fatty acids, particularly tall oil. Frederick H. Gayer and Charles E. Fawkes, assignors to Continental Research Corporation, Chicago Heights, Ill. Filed Oct. 18, 1937. 17 claims. (Cl. 260-107). The fatty acids are esterified, the mixture is neutralized and then treated with two organic solvents and water, the solvents being substantially immiscible in each other and separable into two layers upon the addition of water, whereby the fatty acid esters are precisely dissolved in only one of the organic solvents.

2,166,926. Packing and insulating material. William J. Kropp, Wichita, Kans. Filed Jan. 9, 1939. 2 claims. (Cl. 154-44). Comminuted paper insulation material.

July 25, 1939

2,167,105. Cellulosic material and method of making same. Donald E. Drew, assignor to E. I. du Pont de Nemours & Co., Wilmington, Del. Filed Oct. 22, 1936. 7 claims. (Cl. 91-68). A regenerated cellulose film is treated with an aqueous solution of glycerin and lithium phosphate, the pH of the solution being 7 and 8.

2,167,159. Filter. William H. Oliver, assignor to Oliver United Filters Incorporated, San Francisco, Calif. Filed April 5, 1937. 10 claims. (Cl. 210-202). A rotary drum type filter.

2,167,179. Propulsion mechanism for conveyors. Curt G. Joa, assignor to Curt G. Joa, Inc., Manitowoc, Wis. Filed Aug. 25, 1938. 9 claims. (Cl. 271-2.1).

2,167,214. Apparatus for shredding alkali cellulose or like fibrous materials. Albert Lasch and Eugen Eppler, assignors to Baker Perkins Company, Inc., Saginaw, Mich. Filed Dec. 14, 1938. 1 claim. (Cl. 83-7).

2,167,440. Continuous production of lignocellulose fiber product. William H. Mason, assignor to Masonite Corporation, Laurel, Miss. Filed March 31, 1936. 2 claims. (Cl. 92-39). Process of making hard dense sheet product of lignocellulose containing sufficient noncellulose to be self-bonding, which consists in pressing excess water from a wet sheet and passing the sheet through heated pressure rolls.

2,167,542. Drier felt for paper machines. William A. Barrell, assignor to Lawrence Duck Company, Lawrence, Mass. Filed Sept. 2, 1937. 2 claims. (Cl. 139-410). Means for allowing greater absorbency in the face ply and greater porosity in the back ply than was obtained in earlier felts.

2,167,556. Recovery of lignin from natural cellulose compounds. Judson G. Smull, assignor to Stacom Process Corporation, Long Island City, N. Y. Filed March 18, 1936. 8 claims. (Cl. 260-124). Vegetable material is treated with liquid sulphur dioxide, the mixture filtered and the sulphur dioxide is evaporated, leaving lignin as a solid residue.

August 1, 1939

2,167,626. Preparation of titanium dioxide pigments. Hugh V. Alessandroni, assignor to National Lead Company, New York, N. Y. Filed Oct. 6, 1937. 12 claims. (Cl. 134-58).

2,167,628. Preparation of titanium dioxide pigments. Hugh V. Alessandroni, assignor to National Lead Company, New York, N. Y. Filed Oct. 6, 1937. 11 claims. (Cl. 134-58).

2,167,629. Method of applying gummed tape, labels, and the like. Hans F. Bauer, Jordan V. Bauer and Don M. Hawley, assignors to Stein, Hall Manufacturing Company, Chicago, Ill. Filed Aug. 10, 1938. 12 claims. (Cl. 216-62). Method of moistening dried adhesive with a wetting solution containing a viscosity increasing agent for amylaceous dispersion and thus joining two surfaces.

2,167,652. Method of testing for ink requirements. Fred W. Hoch, Forest Hills, N. Y. Filed June 19, 1936. 2 claims. (Cl. 73-51). Method of ascertaining the coverage of printing ink.

2,167,711. Adhesive coated paper. Harold R. Dalton, assignor to Postal Telegraph-Cable Company (New York), New York, N. Y. Filed April 22, 1936. 8 claims. (Cl. 91-68). A base sheet with a layer of hygroscopic water-soluble adhesive which is covered with a protective coating of an aliphatic amine salt of a fatty acid.

2,167,751. Buttermilk casein product. Charles G. Harford, assignor to Arthur D. Little, Inc., Cambridge, Mass. Filed Oct. 10, 1936. 4 claims. (Cl. 134-12). Method of converting acid precipitated buttermilk casein into a smooth, viscous liquid coating composition.

2,167,752. Casein coating composition and method of preparing the same. Charles G. Harford, assignor to Arthur D. Little, Inc., Cambridge, Mass. Filed Aug. 3, 1937. 6 claims. (Cl. 134-50). Method of converting buttermilk casein into a coating composition.

2,167,753. Mechanism for manufacturing cylindrical containers out of fibrous material suspended in a liquid. Gottfried Held, Bern, Switzerland. Filed July 22, 1936. 3 claims. (Cl. 92-58). A mechanically operated centrifugal part and a manually operated pressure assembly.

2,167,783. Bottle closure or the like and paperboard therefor. Florian A. Strovink, assignor to Bennett Incorporated, Cambridge, Mass. Filed Oct. 6, 1937. 6 claims. (Cl. 215-51). The paperboard contains an internal ply with a cellulose-softening agent in amount sufficient to impart thereto a ply adhesion much lower than that of adjacent plies.

2,167,814. Carton bottom sealing machine. Charles F. Richard, assignor to Johnson Automatic Sealer Co., Ltd., Battle Creek, Mich. Filed April 23, 1938. 22 claims. (Cl. 93-44).

2,167,932. Match booking machine. Eric P. Olson, assignor to The Diamond Match Company, New York, N. Y. Filed Nov. 12, 1938. 5 claims. (Cl. 93-2).

2,167,934. Match-booking machine. Charles F. Wright, assignor to The Diamond Match Company, New York, N. Y. Filed Oct. 5, 1938. 8 claims. (Cl. 93-2).

2,168,040. Coating composition. Walter Nebel, assignor to E. I. du Pont de Nemours & Co., Wilmington, Del. Filed Nov. 30, 1936. 21 claims. (Cl. 134-79). A coating wood and like surfaces comprising cellulose nitrate, a vegetable oil reacted with an oxide of a metal of group 2 of the periodic table and a resin.

2,168,051. Method of manufacturing continuous coated sheets of paper, film or the like. Robert E. Smith and Karl T. Molin, assignors to Defender Photo Supply Company, Incorporated, Rochester, N. Y. Filed Aug. 28, 1936. 1 claim. (Cl. 91-69). Method of applying a water-containing light-sensitive coating.

2,168,095. Apparatus for obtaining fibers from the stalks of flax and other bast plants. Albert Ernest Dodd, Woodford, Dromara, Northern Ireland. Filed May 23, 1938. 1 claim. (Cl. 19-24).

2,168,160. Production of phenol-aldehyde-lignin resins. Carroll A. Hochwalt and Mark Plunguian, assignors to The Mead Corporation, Chillicothe, Ohio. Filed April 9, 1936. 2 claims. (Cl. 260-53). The lignin from sulphite waste liquor is condensed with a phenol and an aldehyde to give a thermosetting resinous molding material.

2,168,217. Shingle. Lester Kirschbraun, assignor to the Patent and Licensing Corporation, New York, N. Y. Filed Sept. 3, 1937. 8 claims. (Cl. 108-8).

2,168,218. Mastic shingle. Lester Kirschbraun, assignor to the Patent and Licensing Corporaation, New York, N. Y. Filed Sept. 28, 1937. 2 claims. (Cl. 108-8).

2,168,222. Apparatus for applying adhesive to labels and the like. Nathan Lanes, Brooklyn, N. Y. Filed Jan. 30, 1937. 5 claims. (Cl. 91-50).

2,168,233. Roll, specially suitable for use in paper making machines. William Hulse Millspaugh, Sandusky, Ohio. Filed May 26, 1937. 2 claims. (Cl. 92-49). A top roll comprising a centrifugally cast shell of uniform thickness and density.

2,168,283. Segmental abrasive wheel. Hugo W. H. Beth, assignor to Norton Company, Worcester, Mass. Filed Nov. 3, 1937. 1 claim. (Cl. 51-206). A segmental grinding wheel.

August 8, 1939

2,168,399. Dry size. Arthur C. Dreshfield, assignor to Hercules Powder Company, Wilmington, Del. Filed Nov. 17, 1937. 14 claims. (Cl. 134-21). The saponification product of a paraffin hydrocarbon insoluble resin derived from pine wood and an alkaline material selected from the group consisting of alkali metal hydroxides, ammonium hydroxide and alkali metal carbonates.

2,168,422. Method of making boxes. Ernest G. Rider, assignor to Stokes and Smith Company, Philadelphia, Pa. Filed March 12, 1937. 16 claims. (Cl. 93-54).

2,168,543. Container forming machine. John G. Vergobbi, assignor to Pneumatic Scale Corporation, Limited, Quincy, Mass. Filed Nov. 2, 1936. 3 claims. (Cl. 93-44.1).

2,168,560. Process and apparatus for the manufacture of paper. Edgar Alexander Charlton, assignor to International Paper Company, New York, N. Y. Filed Dec. 17, 1934. 5 claims. (Cl. 92-40). Fourdrinier operation with the use of two auxiliary headboxes and slices suspended over the wire, each adding a layer of stock containing filler.

2,168,751. Paper box machine. Melvin H. Sidebotham, West Newton, Mass. Filed March 1, 1937. 5 claims. (Cl. 93-49).

2,168,778. Process of producing waterproof fibrous sheets. John Alexander Montgomerie and Peter Kennedy Archibald, assignors to American Bitumuls Company, San Francisco, Cal. Filed July 31, 1936. 6 claims. (Cl. 92-21). A method of mixing a casein stabilized bituminous emulsion with a paper pulp, adding alum to precipitate the bitumen of said emulsion on the fibers of the pulp and forming a felted fibrous mat.

2,168,803. Method and apparatus for manufacturing wallboard. John Page, assignor to United States Gypsum Company, Chicago, Ill. Filed Oct. 23, 1937. 11 claims. (Cl. 154-2). Method of forming recessed-end plasterboards.

2,168,895. Creped paper and method of making same. Benjamin Asnes, assignor to Dennison Manufacturing Company, Framingham, Mass. Filed July 8, 1936. 10 claims. (Cl. 154-33). A mica-coated creped paper.

2,168,896. Method of creping and coating paper. Benjamin Asnes, assignor to Dennison Manufacturing Company, Framingham, Mass. Filed July 16, 1936. 2 claims. (Cl. 154-33). Paper is creped, treated with an adhesive and coated with glistening flakes.

2,168,928. Single ply asbestos faced drier felt. William A. Barrell, assignor to Lawrence Duck Company, Lawrence, Mass. Filed July 13, 1937. 10 claims. (Cl. 139-383).

2,168,968. Web coating apparatus. David A. Babcock and Henry E. Van Derhoef, assignors to Eastman Kodak Company, Rochester, N. Y. Filed Jan. 11, 1939. 7 claims. (Cl. 91-46).

2,168,996. Apparatus for making paper. Geroud T. Lane and Wendell Butterfield, assignors to Eastman Kodak Company, Rochester, N. Y. Filed May 18, 1937. 8 claims. (Cl. 92-42). Design and operation of cylinder and making wire wet end, in which stock is fed at several successive stages to the cylinder and baffled across the width of the cylinder.

August 15, 1939

2,169,277. Composite sheet material. Francis Gurney Okie, assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn. Filed Nov. 30, 1934. 13 claims. (Cl. 91-70). A paper or fabric base having a non-brittle under coat of a tenacious film forming oil mixture and a smoother harder top coat of a drying oil-resinous mixture.

2,169,345. Method and machine for producing paper containers. Karl Küchler, assignor to Jagenberg-Werke Akt.-Ges., Dusseldorf, Germany. Filed May 24, 1937. 19 claims. (Cl. 93-49).

2,169,415. Toilet sheet. Willi Giese, Nijmegen, Netherlands. Filed May 25, 1937. 1 claim. (Cl. 154-46). A toilet sheet consisting of a continuous web of thin creped tissue paper forming one layer of the sheet and a plurality of continuous webs of cellulose wadding forming other super-imposed layers of the sheet.

2,169,473. Method of producing cellulose pulp. Frederich Olson, assignor to The Cellulose Research Corporation, East Alton, Ill. Filed Feb. 8, 1935. 3 claims. (Cl. 92-13). Chips which have been impregnated with calcium hydroxide, calcium sulphide or magnesium hydroxide are heated, while adding more reagent to maintain the concentration, until the non-cellulosic content of the wood is uniformly modified and then defibering the treated wood.

2,169,505. Method for making stretchable paper. Clayton Carr Sherman, assignor to H. P. Smith Paper Company, Chicago, Ill. Filed Jan. 15, 1937. 2 claims. (Cl. 154-33). A method of setting the corrugations of a longitudinally corrugated web.

2,169,575. Board-cutting machine. Theodore T. Youngfelt, Joseph A. Besal and Ralph H. Hurd, assignors to United States Gypsum Company, Chicago, Ill. Filed Nov. 15, 1937. 10 claims. (Cl. 164-68).

2,169,706. Guide control mechanism. William C. Nash, assignor to Gilbert & Nash Company, Neenah, Wis. Filed Jan. 24, 1936. 2 claims. (Cl. 74-241). An endless travelling flexible carrier.

2,169,864. Receptacle and method of forming the same. H. Chester Aument, Long Island City, N. Y. Filed Aug. 12, 1937. 1 claim. (Cl 93-39.1).

2,169,975. Laminating apparatus. Leon Gold, Brooklyn, N. Y., assignor of one-half to Moses Krivis. Filed Jan. 8, 1936. 8 claims. (Cl. 154-36). Method of preparing a cement board.

2,169,978. Machine for and method of applying transparent windows to envelope blanks. Lewis C. Pearce, assignor to William C. Labombarde, Nashua, N. H. Filed Aug. 9, 1937. 24 claims. (Cl. 93-61).

2,169,980. Cement mix. Edward W. Scripture, Jr., assignor to The Master Builders Company, Cleveland, Ohio. Original application

filed Nov. 6, 1934; divided and this application filed Jan. 9, 1939. 8 claims. (Cl. 106-27). In preparing a mortar one-half to one and one-half pints of sulphite water liquor is added per sack of cement.

AUGUST 22, 1939

2,170,109. Forming wire support for paper machines. Earl E. Berry, assignor to Beloit Iron Works, Beloit, Wis. Filed Dec. 15, 1937. 3 claims. (Cl. 92-44). Deflector lips on the bearing support for the small diameter table rolls extending laterally outward from the ascending side of the table rolls and define flat surfaces adjacent the tops of the rolls over which the forming wire passes.

2,170,140. Process of applying material to a sheet or web. William F. Grupe, assignor to Chambon Corporation, Garfield, N. J. Filed Aug. 19, 1936. 4 claims. (Cl. 91-70). Method of coating with a material which is liquid when heated but solid when cold.

2,170,271. Starch composition and process. James F. Walsh and Willard L. Morgan, assignors to American Maize-Products Company, Chicago, Ill. Filed March 5, 1938. 8 claims. (Cl. 127-33). Starch and a water-soluble acid salt of an amide.

2,170,272. Starch composition. James F. Walsh and Willard L. Morgan, assignors to American Maize-Products Company, Chicago, Ill. Filed March 5, 1938. 8 claims. (Cl. 127-33). Starch and an acid salt of an amino acid.

2,170,273. Adhesive composition. Willard L. Morgan, assignor to American Maize-Products Company, Chicago, Ill. Filed Dec. 14, 1937. 6 claims. (Cl. 134-23.8). A water-soluble adhesive protein and a water-soluble aliphatic alkylolamine lactate.

2,170,308. Fourdrinier manufacture. Andrew Purves, Holyoke, Mass. Filed Jan. 21, 1938. 4 claims. (Cl. 153-32). Apparatus for processing a Fourdrinier wire.

2,170,422. Envelope machinery. Abraham Novick, assignor to F. L. Smithe Machine Company, Inc., New York, N. Y. Filed July 6, 1936. 11 claims. (Cl. 271-62).

2,170,560. Intaglio roll. Charles T. Hayes, assignor to James River Paper Products, Inc., Richmond, Va. Filed March 25, 1937. 6 claims. (Cl. 91-51). A device for laying transverse strips of adhesive on a traveling sheet of paper.

2,170,654. Adhesive-coated paper. Harold R. Dalton, assignor to Postal Telegraph-Cable Company (New York), New York, N. Y. Filed April 23, 1936. 9 claims. (Cl. 91-68). A roll of paper with a layer of hygroscopic water-soluble adhesive on one side and superposed thereon a slightly tacky protective layer of dextrin and a little starch.

2,170,655. Laminated crepe cellulosic product. Charles A. Fourness, assignor to Paper Patents Company, Neenah, Wis. Filed Sept. 5, 1936. 2 claims. (Cl. 154-44). A bulky, porous, multi-ply pad or bat particularly suitable for use as an insulating material, containing 10 to 50 per cent of asphalt.

2,170,755. Method of making resin-free compositions. Norman D. Hanson, assignor to Bakelite Corporation, New York, N. Y. Filed April 8, 1935. 5 claims. (Cl. 92-21). A sheeted mixture of a fibrous material and from 15 to 40 per cent of a phenol-aldehyde resin reacted approximately to the gel point with from 5 to 25 per cent of a free-flowing, quick-curing phenol-aldehyde resin.

2,170,759. Paper box construction. John Howard Lentine and Victor Loigman, assignors to Central Paper Box Company, Philadelphia, Pa. Filed May 14, 1938. 17 claims. (Cl. 93-41).

AUGUST 29, 1939

2,170,800. Process for making composite titanium pigments. Louis E. Barton, assignor to National Lead Company, New York, N. Y. Filed Aug. 11, 1938. 12 claims. (Cl. 134-58). Titanium dioxide-calcium carbonate pigment.

2,170,827. Cellulosic pellicles and methods for producing same. William Frederick Underwood and Henry S. Rothrock, assignors to E. I. du Pont de Nemours & Co., Wilmington, Del. Filed Jan. 4, 1936. 22 claims. (Cl. 91-68). Water-sensitive film suitable for use as a wrapping tissue from an aqueous alkaline cellulosic solution containing an organic compound as a deformation-restricting agent.

2,170,828. Pellicle and process for preparing same. Frederick M. Meigs, assignor to E. I. du Pont de Nemours & Co., Wilmington, Del. Filed Jan. 4, 1936. 16 claims. (Cl. 91-68). Water-sensitive film suitable for use as a wrapping tissue formed from an aqueous alkaline cellulosic solution and containing an ester of a carboxylic acid as a deformation-restricting agent.

2,170,829. Film and process for preparing same. Frederick M. Meigs, assignor to E. I. du Pont de Nemours & Co., Wilmington, Del. Filed Jan. 4, 1936. 16 claims. (Cl. 91-68). Water sensitive film suitable for use as a wrapping tissue formed from an aqueous alkaline cellulosic solution and containing a carbamic acid ester as a deformation-restricting agent.

2,170,839. Cellulosic pellicles and process for preparing same. Henry S. Rothrock, assignor to E. I. du Pont de Nemours & Co., Wilmington, Del. Filed Jan. 4, 1936. 20 claims. (Cl. 91-68). A water-sensitive film containing an organic ester as a deformation-restricting agent.

2,170,840. Cellulose film and process for preparing same. Henry S. Rothrock, assignor to E. I. du Pont de Nemours & Co., Wilmington, Del. Filed Jan. 4, 1936. 16 claims. (Cl. 91-68). Water-sensitive film with an ester of a keto acid as deformation-restricting agent.

2,170,940. White titanium dioxide pigment. Roy Dahlstrom, assignor to National Lead Company, New York, N. Y. Filed Dec. 24, 1936. 12 claims. (Cl. 134-58). Method for increasing the reflectance of a titanium dioxide pigment in the shorter wavelengths of the visible spectrum.

2,170,945. Crinkled paper tube and method of forming same. Edwin D. Greene, assignor to Arkell Safety Bag Company, New York, N. Y. Filed May 6, 1937. 6 claims. (Cl. 93-35).

2,170,949. Process of preparing adhesive sheets. Willard L. Morgan, assignor to Sylvania Industrial Corporation, Fredericksburg, Va. Filed June 23, 1936. 13 claims. (Cl. 91-68). An odorless pressure-sensitive adhesive consists of rubber, a resin and phthalic acid in a suitable solvent.

2,171,140. Pressure sensitive adhesive sheet. Ralph T. K. Cornwell, assignor to Sylvania Industrial Corporation, Fredericksburg, Va. Filed Aug. 1, 1936. 4 claims. (Cl. 91-68). An adhesive material comprising a pellicle composed of a substance selected from the class consisting of non-fibrous cellulose hydrate, etc., and having a pressure-sensitive rubber adhesive coating and an intermediate coating of a water-soluble agglutinant, such as gelatine, glue, etc.

2,171,143. Thick butt shingle. Clarence R. Eckert, assignor to The Patent and Licensing Corporation, New York, N. Y. Filed October 28, 1931. 2 claims. (Cl. 108-8).

2,171,155. Method of making asbestos-cement shingles. William R. Wright, Jr., assignor to The Patent and Licensing Corporation, New York, N. Y. Filed April 12, 1937. 1 claim. (Cl. 92-66).

2,171,312. Consistency control device. Sidney E. Meyers, assignor to Control Equipment Corporation, Buffalo, N. Y. Filed May 6, 1935. 7 claims. (Cl. 92-46).

2,171,389. Process of applying a coating of lacquer to flexible materials. Steven Jan Blaupot ten Cate, Kootwijk, Netherlands. Filed April 13, 1937. 10 claims. (Cl. 91-68).

2,171,413. Apparatus for and method of reshaping a molded pulp article. Merle P. Chaplin, assignor to Chaplin Corporation, South Portland, Maine. Filed June 7, 1937. 12 claims. (Cl. 93-55).

2,171,418. Carton machine and method of forming cartons. Frank D. Palmer, Chicago, Ill.; assignor of one-third each to Oliver P. Kline and Cranston Spray. Filed July 20, 1936. 59 claims. (Cl. 93-44).

2,171,419. Fabric-reinforced artificial leather. Milton O. Schur and Benjamin G. Hoos, assignors to Brown Company, Berlin, N. H. Filed Feb. 18, 1936. 11 claims. (Cl. 154-50). A composite sheet comprising a felt layer bonded to a cloth reinforcement.

2,171,427. Wrapping material. John Eggert and Bruno Wendt, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Germany. Filed May 19, 1937. 8 claims. (Cl. 91-68). A 1, 3, 5-triazine derivative is incorporated into a sheet material permeable to ultraviolet light.

SEPTEMBER 5, 1939

R21,195. Treating surfaces of fibrous materials. Charles M. Boyce, by John R. Ditmars, assignee, New Brunswick, N. J. Original No. 1,978,406, dated October 30, 1934. Application for reissue Nov. 20, 1937. 6 claims. (Cl. 91-68).

R21,201. Machine for removing water from pulp, cellulose, and the like. Olaf Qviller, assignor to Fibre Making Processes, Inc., Chicago, Ill. Original No. 1,995,011, dated March 19, 1935. Application for reissue Dec. 19, 1938. 4 claims. (Cl. 92-43).

2,171,667. Roll-winding mechanism. Alfred O. Mickelson and Louis C. Schillo, assignors to Roofing Machinery Manufacturing Company, Inc., Chicago, Ill. Filed Oct. 16, 1937. 5 claims. (Cl. 33-132). A web rewind machine.

2,171,739. Stock feed box for paper machines. Earl E. Derry, assignor to Beloit Iron Works, Beloit, Wis. Filed Jan. 15, 1937. 7 claims. (Cl. 92-44). A stock feed box having a movable forming surface.

2,171,775. Laminated paper. Van Hamm Wilshire, assignor to The Specialty Papers Company, Dayton, Ohio. Filed Dec. 5, 1935. 5 claims. (Cl. 229-3.5). A butter container is formed of a paper sheet having an inner surface of vegetable parchment and an outer surface of paraffin-containing opaque paper of light color bonded by a layer of paraffin.

2,171,796. Starch process. Alfred H. Kelling, assignor to Corn Products Refining Company, New York, N. Y. Filed May 29, 1937. 5 claims. (Cl. 127-33). Process for the production of a modified starch.

2,171,986. Paper and paper making. Paul Poetschke, Bronxville, N. Y. Filed Aug. 13, 1937. 3 claims. (Cl. 131-36). A cigarette paper carrying a nitrogen-bearing compounds, such as amino acids, urea, ammonium nitrate, etc., in such proportions that the burning paper yields an alkaline smoke.

2,172,028. Production of leatherlike surfaces. Raymond C. McQuiston, West Newton, and Henry C. Hopewell, Newton, Mass. Filed Aug. 30, 1935. 13 claims. (Cl. 91-68). Dry ground leather is deposited on a fibrous base having a bonding surface.

2,172,120. Digester top relief screen. Paul Boehm, Rhinelander, Wis. Filed Dec. 14, 1937. 1 claim. (Cl. 92-7).

2,172,319. Blue print coating. Garnet Philip Han, assignor to American Cyanamid Company, New York, N. Y. Filed May 20, 1939. 7 claims. (Cl. 95-6). A light sensitive ferric salt, a soluble ferricyanide and a quaternary ammonium compound.

SEPTEMBER 12, 1939

2,172,392. Emulsion and method of preparing same. Otto Kress and Charles E. Johnson, assignors to The Institute of Paper Chemistry, Appleton, Wis. Filed April 23, 1936. 16 claims. (Cl. 134-1). A wax emulsion containing milk casein, the ration of casein to wax being at least about 1:4.

2,172,430. Single ply drier felt with asbestos facing. William A. Barrell, assignor to Lawrence Duck Company, Lawrence, Mass. Filed Oct. 14, 1937. 8 claims. (Cl. 139-383). A warp and filling of non-asbestos strands with float warp strands of asbestos fiber.

2,172,445. Impregnated fibrous material and composition suitable for impregnating such material. Raymond P. Lutz, assignor to Western Electric Company, Incorporated, New York, N. Y. Filed Oct. 31, 1936. 6 claims. (Cl. 154-2.6). A fibrous sheet impregnated with a composition of a cellulose derivative and an oxidized abietic acid, having a sheet of cellulose derivative adhered to one face to form a composite sheet.

2,172,449. Wood chipping machine. Frank Pelot and Richard Gotz, assignors to Carthage Machine Company, Carthage, N. Y. Filed Nov. 29, 1937. 4 claims. (Cl. 83-75).

2,172,698. Fire, water, and mildew resisting compound and fabric. Edwin C. Clayton and Lawrence L. Heffner, assignors to Wm. E. Hooper & Sons Company, Baltimore, Md. Filed April 20, 1939. 24 claims. (Cl. 134-11). A chlorinated organic compound is used.

2,172,723. Paper rack and slicer. Oswald K. Hoglund and Fred W. Herbert, Santa Paula, Calif. Filed Nov. 17, 1938. 1 claim. (Cl. 242-55.4).

2,172,856. Safety paper and method of making same. Francis L. Simons, assignor to George La Monte & Son, Nutley, N. J. Filed Feb. 4, 1935. 8 claims. (Cl. 91-67.95). The paper contains a substituted thiourea containing an aromatic or heterocyclic substituent and an alkali metal bromide.

2,172,974. Saturated fibrous material and saturant and method of making the same. Leander H. Hills, assignor to The Vellumoid Company, Boston, Mass. Filed Jan. 22, 1936. 12 claims. (Cl. 134-26). A method of bodying tung oil.

2,172,988. Production of cardboard box cuttings. Arthur Ponndorf and Walter Fuhrmann, assignors to Universelle Cigarettenmaschinenfabrik J. C. Muller & Co., Dresden, Germany. Filed May 20, 1937. 7 claims. (Cl. 164-18). A device for cutting out cardboard cuttings from a web of material.

2,173,041. Production of starch solutions. Josef Müller, Weissenstein-on-the-Drau, Carinthia, Austria. Filed Dec. 31, 1937. 15 claims. (Cl. 127-33). Starch is heated with water and a persulfate, with or without an alkaline reacting percompound.

SEPTEMBER 19, 1939

2,173,097. Paper carrier sheet for tacky rubber and process of making same. George W. Coggeshall, assignor to S. D. Warren Company, Boston, Mass. Filed Aug. 22, 1936. 3 claims. (Cl. 91-68). Paper is impregnated with a water-soluble organic adhesive and a plasticizer to increase the strength, toughness and split-resistance and then surface-coated with flexibilized starch and friction calendered.

2,173,127. Overhead logging. Herman O. Nelson, Doty, Wash. Filed June 28, 1937. 8 claims. (Cl. 212-98).

2,173,129. Coated and impregnated paper and process of manufacture thereof. Nicholas E. Oglesby, Troy, N. Y. Filed July 6, 1936. 9 claims. (Cl. 91-68). The paper is treated with a water-resistant saturating medium which is flexible when set, such as a semi-drying oil, a drying oil or a resin, dried and coated with a paint, lacquer, varnish or resin, giving a waterproof, flexible sheet.

2,173,130. Treated and coated paper and process of manufacture thereof. Nicholas E. Oglesby, Troy, N. Y. Filed July 16, 1936. 3 claims. (Cl. 91-68). Paper is impregnated with 20 to 50 per cent (on weight of paper) of a semi-drying oil and given a surface coating of a paint, lacquer, varnish or resin, giving a waterproof, flexible sheet resistant to cracking and peeling.

2,173,141. Electrolytic recording paper. Paul Talmey, assignor to Radio Inventions, Inc.,

New York, N. Y. Filed July 16, 1935. 8 claims. (Cl. 204-1). The paper contains an oxyhalide of antimony or bismuth and an electrically conductive compound.

2,173,167. Paper and method of making the same. Rexford William Hovey, assignor to Oxford Paper Company, New York, N. Y. Filed June 26, 1937. 7 claims. (Cl. 92-21). A paper containing at least 20 per cent of mechanical pulp and at least 10 per cent of an alkaline carbonate filler, the remainder of the furnish being sulphite or soda pulp.

2,173,241. Process for treating fibrous material. Howard A. Young, assignor to United States Rubber Company, New York, N. Y. Filed Jan. 3, 1938. 8 claims. (Cl. 91-68). Method of depositing rubber latex on a fibrous material.

2,173,242. Process for treating fibrous material. Howard A. Young, assignor to United States Rubber Company, New York, N. Y. Filed Jan. 3, 1938. 8 claims. (Cl. 91-68). Method of depositing rubber latex on a fibrous material.

2,173,243. Process for treating fibrous materials. Howard A. Young, assignor to United States Rubber Company, New York, N. Y. Filed Jan. 3, 1938. 10 claims. (Cl. 91-68). A method of depositing rubber latex on a fibrous material.

2,173,244. Process for treating fibrous materials. Howard A. Young, assignor to United States Rubber Company, New York, N. Y. Filed Jan. 3, 1938. 10 claims. (Cl. 91-68). A method of depositing rubber latex on a fibrous material.

2,173,317. Felt conditioner for paper-making machines. Frederick William Vickery, Westminster Bridge, London, England. Filed Feb. 27, 1937. 2 claims. (Cl. 92-50).

2,173,391. Process of manufacturing fibrous products. George H. Ellis, assignor to The Insulite Company, Minneapolis, Minn. Filed Nov. 27, 1935. 3 claims. (Cl. 92-39). A method of drying a board under pressure to secure a stiff, homogeneous product; the temperature decreases and the pressure increases as the moisture decreases.

2,173,453. Tissue paper preservative wrapper for citrus fruits and method of making same. Robert G. Misplay and William G. Barber, assignors to Crown Zellerbach Corporation, San Francisco, Calif. Filed May 17, 1939. 4 claims. (Cl. 91-68). A fruit wrapper contains 0.0175 to 0.0297 of its weight of diphenyl.

2,173,474. Bleaching. Martin Evoy, Abington, Pa. Filed April 14, 1939. 6 claims. (Cl. 8-111). An acid solution of hydrogen peroxide at 100 deg. C.

2,173,796. Abrasive coated sheet. Nicholas E. Oglesby, assignor to Behr-Manning Corporation, Troy, N. Y. Filed July 6, 1936. 6 claims. (Cl. 51-280). A paper backing sheet containing as a softening agent triethanolamine and abrasive grits attached by a water-soluble adhesive.

2,173,815. Heat insulating material and method of forming the same. Theodore B. Slisz and Clyde C. Schuetz, assignors to United States Gypsum Company, Chicago, Ill. Filed May 19, 1937. 18 claims. (Cl. 154-28). A sheet of metal foil adhesively secured to an insulating base member, the base member being indented to cause rupture of the metal foil.

SEPTEMBER 26, 1939

2,173,829. Unified paper web. Richard Gurley Drew, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn. Filed March 24, 1938. 8 claims. (Cl. 91-68). Method of impregnating a bibulous paper with a glue and plasticizing agent.

2,173,852. Machine for making corrugated paper. Charles D. Miller, Huntington Park, Cal. Filed March 10, 1937. 13 claims. (Cl. 154-31).

2,173,854. Envelope making machine. Abraham Novick, assignor to F. L. Smithe Machine Company, Inc., New York, N. Y. Filed Sept. 14, 1935. 13 claims. (Cl. 93-61).

2,173,859. Manufacture of tubes. Rene P. Piperoux, assignor to Celluloid Corporation, New York, N. Y. Filed July 2, 1937. 20 claims. (Cl. 93-82). Method of making tubes or cylinders from flat stock material.

2,173,861. Stiffening sheet material. Roy Stafford Ritchie, assignor to Celluloid Corporation, New York, N. Y. Filed May 5, 1936. 9 claims. (Cl. 91-68). A base sheet is impregnated with a solution of a cellulose derivative in a low boiling solvent and the cellulose is precipitated by applying a heated vapor of an impregnating agent.

2,173,877. Recovery of sulphur dioxide from gas mixtures. Arthur Maurice Clark, William Edward Batten, and Charles Frederick Reed Harrison, Norton-on-Tees, England, assignors to Imperial Chemical Industries Limited. Filed Oct. 10, 1935. 25 claims. (Cl. 23-178). Sulphur dioxide is absorbed in an aqueous solution of basic aluminum sulphate.

2,173,927. Method of preparing paper for bending. Harry B. Allen, assignor to Schaefer Mounters, Inc., Webster, N. Y. Filed Feb. 24, 1937. 1 claim. (Cl. 92-70). A method of ribbing and scoring paper pulp board.

2,173,931. Paper-slitting device. Arthur E. Broughton, Glens Falls, N. Y. Filed Aug. 25, 1938. 6 claims. (Cl. 164-47).

2,173,975. Method of and apparatus for blunging clay. Sanford C. Lyons, assignor to Bird Machine Company, Walpole, Mass. Filed Feb. 14, 1936. 10 claims. (Cl. 83-94).

2,173,095. Paper manufacture. Wellington G. Reynolds, assignor to Reynolds Manufacturing Company, Holyoke, Mass. Filed April 21, 1938. 1 claim. (Cl. 92-21). A sheet of writing paper consisting of approximately 20 per cent soda pulp, 60 per cent sulphite and about 20 per cent of unbleached sulphite pulp and containing about 0.75 of an ounce of Paper Yellow C. H., Index No. 365, to every 1700 pounds of said stock.

2,174,112. Paper sheet breaking apparatus. Frank T. Sheedy and Louis Traung, assignors to The Traung Company, San Francisco, Cal. Filed June 20, 1938. 12 claims. (Cl. 91-18).

2,174,438. Process of making adhesive or sizing material. John F. Corwin and Henry V. Dunham, Bainbridge, N. Y. Filed Feb. 17, 1937. 4 claims. (Cl. 134-20). Seed meal is extracted with an alkaline solution and the solution is evaporated.

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C. for 10 cents each. Send currency, not stamps.

PAPER SPECIALTIES

Insectproof Building Paper. Newton P. Easling. U. S. pat. 2,129,659 (Sept. 13, 1938).—A paper for use in building construction consists of a felt base saturated with a mixture consisting of 73 per cent asphalt paint, 25 per cent arsenate of lead, 1 per cent nicotine sulphate and 1 per cent inert substances. (Cl. 91-68).—A.P.-C.

Flexible Covering and Method of Making Same. Frank M. Beegle and Harry L. Andrews, Jr., assignors to Congoleum-Nairn, Inc. U. S. pat. 2,133,886 (Oct. 18, 1938).—A fibrous, sheet-like, foundation member is impregnated with a bituminous saturant, and there is applied to the surface of the sheet an aqueous emulsion containing a drying oil, an oil-soluble phenol-aldehyde resin and an ammonium soap. The surface is then subjected to an appropriate treatment to evaporate the water, drive off the ammonia component of the soap and oxidize the drying oil, thereby forming a sealing coat. A decorative and wear-resisting coating is then applied. (Cl. 91-68).—A.P.-C.

Apparatus for Face Saturating Porous Materials in the Manufacture of Hard Surface Floor Coverings. Leon E. Crew, assignor to Delaware Floor Products, Inc. U. S. pat. 2,117,840 (May 17, 1938).—A strip of flooring felt is heated moderately and while warm there is applied to one of its faces a film of saturant by transferring the liquid saturant to the web from a moving surface to which the liquid saturant is supplied in a continuous substantially uniform film. The surface carrying the film is preferably moved at a somewhat higher speed than the web at the point of engagement of the two. If the strip is to be printed, it is at once led to the printing machine. (Cl. 91-51).—A.P.-C.

Floor-Covering Material. James A. Arvin and Geo. L. Schwartz, assignors to Krafelt Corporation of America. U. S. pat. 2,121,679 (June 21, 1938).—A process for producing in a single continuous operation a substantially filled and printed floor covering involves printing absorbent sheet material from the face with high-viscosity, high-pigment, low solvent content print paint, the nonvolatile part of which consists of 55 to 70 per cent pigment. By this step the sheet is saturated to from 60 to 80 per cent of its saturation capacity. The paint penetrates and prints through the absorbent sheet, sealing the pores toward the surface to an extent that the sheet will not accept from the face any substantial amount of additional filling material. Saturant is then applied to the sheet from the back, and the sheet is cured at elevated temperature, the application of the saturant producing a substantially filled sheet at the curing stage. (Cl. 91-70).—A.P.-C.

Insulating and Waterproofing Material. Albert C. Fischer, assignor to The Philip Carey Manufacturing Company. U. S. pat. 2,123,696 (July 12, 1938).—The invention comprises a homogeneous mass of compressible fibrous granules (cork, corn cob pith, mineral wool, etc.), fibers (cotton, cottonseed hulls, rag felt, etc.) and a waterproofing binder of relatively high melting point (blown asphalt, coal tar pitch, etc.) for holding the granular material which is distributed throughout and locked within the pockets formed be-

tween the fibers. The ingredients of the composition and method of mixing them produces an article which is thoroughly waterproofed and possessed of a thermal insulating value approximately twice that of ordinary asphalt roofing. (Cl. 106-31).—A.P.-C.

Surfacing Roofing Shingles. Thomas Robinson, assignor to Lancaster Processes, Inc. U. S. pat. 2,118,526 (May 24, 1938).—The article to be surfaced is first coated with a high melting-point oxidized asphalt which has been cut back with a volatile solvent and filled with an inorganic material such as amorphous silica. Over this coating, granules of the desired surfacing material are spread before the solvent evaporates, so that the granules settle into the coating. The granular material is applied in such quantities that a layer of granules appears on the top of the coating with the exposed surfaces of the granules uncoated by asphalt. In order to ensure settling of the granular material into the coating, the article is vibrated after application of the granular surfacing. In order to recover the solvent, it is preferably evaporated in a chamber into which warm air is introduced and exhausted, the solvent being then recovered from the air current in the usual way. (Cl. 91-68).—A.P.-C.

Apparatus for Coating and Slating Roofing Shingles. Wm. G. Duddleston, assignor to The Patent and Licensing Corporation. U. S. pat. 2,122,739 (July 5, 1938).—The invention provides an apparatus wherein shingle strips are fed to a conveyor which carries them flat. While on the conveyor, portions of the shingle strips are preferably heated to drive off moisture; predetermined portions of the strips (generally the portions which are exposed to the weather when the shingles are laid on the roof) are coated with films of material such as heated asphalt; they are then surfaced on one or both sides with colored granular material, which are subsequently embedded into the coating by pressure, and the excess granular surfacing is removed. The shingles are then transferred to a second conveyor on which they are supported in a vertical position and spaced from one another in order to allow the coating to cool and harden. (Cl. 91-43).—A.P.-C.

Roofing Felt. Lester Kirschbraun, assignor to The Patent and Licensing Corporation. U. S. pat. 2,122,747 (July 5, 1938).—The felt is provided with vents to permit the escape of entrapped air and steam in the use of these felts in laying built-up roofs. (Cl. 108-7).—A.P.-C.

Roofing. Ayana L. Wall. U. S. pat. 2,122,077 (June 28, 1938).—A roofing element comprises a strip of saturated felt having a coating of adhesive material and granules applied over the whole of the upper surface, a second similar coating over the first coating, a third coating of adhesive and granular surfacing extending over the whole of the lower surface, and a fourth coating adhesive and granular surfacing over the third coating and extending from the bottom of strip only partly up to the top. (Cl. 108-7). —A.P.-C.

Insulating Board. Duncan R. Seeman, assignor to Seaman Paper Company. U. S. pat. 2,116,771 (May 10, 1938).—An insulating board suitable for lining automobile dash boards comprises a body of loosely felted fibrous material (suitably kapok) having a number of indentations and projections upon each face. A waterproof coating conforming with the indentations and projections is applied to one of the surfaces, and a fibrous liner also conforming with the indentations and projections is applied over the coating. The crests of the opposite surface are adhesively united to the metal of the dash board. (Cl. 154-44).—A.P.-C.

Building Insulation. Lawrence D. Morton, assignor to The Hinde and Dauch Paper Co. U. S. pat. 2,123,761 (July 12, 1938).—An insulating mat is built up of a number of alternately flat and corrugated sheets with the corrugations all extending in the same direction, following by shortening the sheet in a direction transverse to the corrugations, thereby wrinkling the flat sheets, but to a degree not sufficient to close the corrugations. (Cl. 20-4).—A.P.-C.

Automobile Insulation. Charles A. Upson, assignor to The Upson Company. U. S. pat. 2,110,492 (March 8, 1938).—A layer of fibrous insulating material, suitably felt paper having a series of cavities in the form of depressions or openings, is applied and affixed by means of a tacky adhesive (such as asphalt) to a substantial area of the inner surface of an automobile body sheet. (Cl. 154-44).—A.P.-C.

Colored Roofing. Carl E. Hillers assignor to Blue Ridge Slate Corp. U. S. pat. 2,122,862 (July 5, 1938).—Roofing elements are color-coated by applying mineral granules to a web of roofing, bringing to a temperature of about 90 deg. F., applying to the exposed surfaces of the granules a mixture of barium fluosilicate, coloring agent, filler and alkali-metal silicate. The web is cut into the desired elements, which are formed into bundles and subjected to a temperature of 80 to 125 deg. F. for from 1 to 4 days in an atmosphere of 85 per cent to 100 per cent relative humidity, and then for one to two days in an atmosphere of about 50 per cent relative humidity. (Cl. 91-70).—A.P.-C.

Method of and Apparatus for Felting Fibrous Shingles. Jerome J. Blum, assignor to Arveyware Corporation U. S. pat. 2,124,103 (July 19, 1938).—A screen-covered mould is immersed in a body of pulp which is of variable consistency, being thicker at the bottom than at the top. Suction is applied to the inside of the mould while immersed. When the desired thickness of pulp has been deposited, the mould is removed from the pulp and suction is discontinued to permit removal of the felted article. (Cl. 92-54).—A.P.-C.

Shingle. Armand R. Bollaert, assignor to The Lehon Company. U. S. pat. 2,113,644 (April 12, 1938).—In order to overcome the "flat" appearance of ordinary asphalt-impregnated shingles, the butt-edge of the shingle is made thicker by increasing the amount of asphalt saturation and coating at this point relatively to the head lap end of the shingle. The thickened butt portion is surfaced with mineral granules, and the thinner head lap end is surfaced with mica, clay, or the like. (Cl. 108-7).—A.P.-C.

Roofing Strip. Wm. B. Robinson, assignor to Wm. B. Robinson Corporation. U. S. pat. 2,110,579 (March 8, 1938).—The strip is made up of three principal parts all firmly attached or adhered together, one of the parts serving as a roofing deck, thus eliminating the necessity of first applying a deck to the rafters, another part serving as a heat insulating layer, and a third part serving as the shingle or waterproof portion of the strip. The strip can be fabricated at the factory and shipped in convenient lengths ready for installation and use. (Cl. 108-8). —A.P.-C.

Sulphidity Effect in the Sulphate Pulping of Douglas Fir*

By Mark W. Bray[1], J. Stanley Martin[2], and S. L. Schwartz[3]

Abstract

The effect of varying the sulphidity of sulphate cooking liquors from zero to 100 per cent was determined for liquors of 20 per cent free alkali (sodium hydroxide) content for one set of cooking conditions. Liquors of 100 per cent sulphidity (sodium sulphide only) may be satisfactorily used for pulping Douglas fir, provided sufficient chemical is present to effect delignification. Sodium sulphide has a specific effect in pulping in addition to its caustic content made available through hydrolysis. While this chemical may act to some extent as a buffering agent, the sulphide or the hydrosulphide-ion appears to act mainly as a substance of high reactivity toward lignin or encrusting substances in wood. Replacement of caustic soda, therefore, with sodium sulphide at constant initial alkalinity results in a progressive decrease in yield and bleach requirement of the resulting pulps from Douglas fir up to sulphidities of 34 per cent. Further increases in sulphidity up to 100 per cent result in only slight changes in yield and pulp quality.

Although sulphidity of kraft cooking liquors is recognized as an important variable of the sulphate process and has commanded the attention of investigators *(1)* as far back as 1893, there is still considerable controversy as to the exact effect that changing the ratio of caustic soda to sodium sulphite has on yield and quality of the pulps obtained. Wells *(2)* states that there is an optimum sulphidity for each species, Kress and McGregor *(3)* maintain, in dealing with normal kraft cooking liquors, that the ratio of these two active pulping agents cannot be decreased much beyond that of two parts of caustic soda to one part of sodium sulphide and still attain reasonable fiberization of the wood. Some kraft mill operators contend that kraft liquors containing sodium sulphide produce higher yields of easier bleaching pulps than are obtained through cooking with caustic soda alone. Others believe that liquors of low sulphidity are more beneficial in reducing bleach requirement than those of high sulphidity. All mill operators agree, however, that changing sulphidity seems to alter the properties *(6)* of the resulting pulps; in some mills liquors of high sulphidity are employed, in others, liquors of low sulphidity.

Much of this difference in opinion on the effect of sulphidity could be eliminated if it is remembered that in replacing caustic soda with sodium sulphide, the latter is only slightly more than half active *(2, 5, 6)*, as a cooking agent in comparison with the activity of caustic soda as shown by the following equation for the hydrolysis of sodium sulphide:

$$Na_2S + H_2O \rightleftharpoons NaOH + NaSH$$

Many mill operators cook with a definite percentage of sodium oxide in their cooking liquor *(7)* and shift the sulphidity thereof from 20 per cent to 30 per cent without taking into consideration the lower activity of sodium sulphide in comparison with caustic soda.

According to the just-mentioned equation, 78 grams of sodium sulphide react with water to produce 40 grams of caustic soda or effiective cooking agent. Since the hydrolysis of sodium hydrosulphide is very small, *(5)* its activity as a pulping agent is likewise very small. Nevertheless, the sulphur either from this compound or from sodium sulphide forms compounds with the lignin residues and are removed from the sphere of the reaction either as gases or bound in the black liquor *(1, 8)* and to that extent aid in the process of wood delignification.

Assuming, then, that the activity of sodium sulphide is equal only to the amount of caustic soda formed through its hydrolysis with water, the substitution of a given weight of caustic soda with an equal weight of sodium sulphide would then, except for the slight activity of sodium hydrosulphide, be equivalent to the addition of only 40/78 or 0.513 parts of active cooking agent (sodium hydroxide) for each part of sodium sulphide employed.

With this fact in mind, the experiments herein reported were so planned as to show the effect of varying the sulphidity over the range of 0 to 100 per cent without changing the available or "effective" alkalinity (free sodium hydroxide content) of the cooking liquors.

Selection, Evaluation, and Preparation of the Raw Material

The pulpwood employed in these experiments was selected by the Pacific Northwest Forest and Range Experiment Station along with several trees of different growth types as representative of young, rapid-growth Douglas fir. The particular wood used was from a single tree, designated as No. 6 in shipment 1466, which was taken from an elevation of 1,200 feet in a mountainous stand in Skamania County, Washington.

The entire merchantable length of the tree was cut into 4-foot logs and the larger logs were split into sectors. Upon receipt of the shipment at the Forest Products Laboratory, the physical and chemical properties of selected logs taken from five different heights in the tree were determined according to standard testing methods. The data obtained for the physical and chemical evaluation of the wood are recorded in Tables I and II.

Since the data show a change in the proportion of springwood, heartwood, and density in proceeding from the butt to the top of the tree, and since a uniform sample of material was desired for the pulping experiments, these particular variables were eliminated by chipping at one time a large number of

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Roosevelt Hotel, New York City, February 20-23, 1939.

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logs representative of the entire bole of the tree. The detailed procedure was as follows:

The wood was hand-peeled and chipped in a two-knife, 48-inch diameter chipper set to produce a 5/8-inch chip while running at a speed of 500 r.p.m. The chips were screened on a shaker screen where the large knots and over-sized material and sawdust were rejected. The entire batch of chips obtained from logs 6, 8, 10, 12, 15, 22, 23, 24, and 25 were thoroughly mixed and stored in airtight cans placed in a room maintained at 40 deg. F. and 93 per cent r.h. Thus all digestions were made on the same uniform material. Previous to pulping, the chips were sampled for moisture content.

Forty-five digestions were made in spherical, steam-jacketed, rotary autoclaves of 3.7 gallons capacity. All digestions were made in triplicate. The ratio of caustic soda to sodium sulphide was varied in small increments from 100 per cent caustic soda to 100 per cent sodium sulphide. The relative amounts of these two chemicals were so calculated that the total initial effective alkali present in the form of sodium hydroxide obtained either from the addition of caustic soda or through the hydrolysis of sodium sulphide was maintained the same for all the digestions, namely, at 20 per cent of the weight of the oven-dry wood charged. Thus, the percentage of total chemicals expressed as the sum of sodium hydroxide and sodium sulphide varied from 20 pounds per hundred pounds of oven-dry wood in the case of the soda digestion to 39 pounds for the digestion made at 100 per cent sulphidity with sodium sulphide alone. Likewise the total sodium oxide content of the cooking liquors varied from 15.5 to 32.0 per cent.

Since the volume of the cooking liquor, including the moisture in the chips, was maintained constant at 48 gallons per hundred pounds of oven-dry wood for all the digestions, the total initial concentration expressed as the sum of the caustic soda and the sodium sulphide varied in like manner from 50 to 97.5 grams per liter, respectively, in cooking with caustic soda alone and with sodium sulphide alone. The concentration of free sodium hydroxide, however, was the same (50 grams per liter) for all the digestions regardless of the sulphidity of the cooking liquors.

TABLE II.—CHEMICAL ANALYSIS OF YOUNG, RAPID-GROWTH DOUGLAS FIR PULPWOOD (TREE NO. 6, SHIPMENT 1466)

Log Number	Cellulose Per Cent	Alpha-cellulose Per Cent	Lignin Per Cent	Pentosans: Total Per Cent	Pentosans: In cellulose Per Cent	Solubility in: Alcohol-benzene Per Cent	Solubility in: Ether Per Cent	Solubility in: 1 per cent NaOH Per Cent	Solubility in: Hot water Per Cent
1	61.5	46.5	27.3	8.3	..	3.9	0.5	11.5	4.0
7	61.6	45.5	27.5	8.8	..	3.0	.4	11.8	3.2
13	62.8	45.9	27.1	9.1	7.3	2.8	.5	12.4	2.9
19	62.1	45.2	26.1	9.8	..	2.8	.6	13.0	2.9
27	59.2	42.8	26.3	10.6	..	3.6	.7	13.6	4.1

Thus the difference in concentration just mentioned is due to the presence of sodium hydrosulphide.

The following calculations were employed in making the several cooking liquors:

For a sulphidity of 33.85 per cent, or a ratio of caustic soda to sodium sulphide of 2 to 1, and an activity equivalent to 20 per cent of pure caustic soda, the amount of sodium sulphide required to replace the equivalent of 1 part of caustic soda is shown by the following calculation:

2 parts NaOH + 1 part Na_2S = per cent of total chemicals (based on the weight of oven-dry wood charged) added.

According to the equation, $Na_2S + H_2O = NaOH + NaSH$, one part of sodium sulphide is equivalent to 40/78 or 0.513 parts of sodium hydroxide, then

2X NaOH + 0.513X Na_2S = 20 per cent of total free or available alkali present as sodium hydroxide,
or $2.513X = 20$; $X = 7.96$

Since the caustic and sulphide are in the ratio of 2 to 1, twice this value (7.96) equals 15.92 per cent or the amount of caustic soda to be added per hundred pounds of oven-dry wood, and 7.96 times 1 equals the percentage of sodium sulphide to be added, making a total of (15.92 + 7.96) or 23.88 per cent. According to the foregoing equation, the total free alkali (sodium hydroxide) present would be [15.92 + (7.96 × 40/78)] or 20 pounds per hundred pounds of oven-dry wood. The total active alkali calculated as sodium oxide in a liquor of this composition would be [(15.92 × 31/40) + (7.96 × 31/39)] or 18.66 pounds per hundred pounds of oven-dry wood. Neglecting the small quantity of the practically inactive sodium carbonate in the liquors used, the sulphidity of such a liquor would be (6.33/18.66) or 33.85 per cent.

A linear temperature-pressure schedule was followed in the digestions in which 1½ hours were al-

TABLE I.—PHYSICAL CHARACTERISTICS OF YOUNG, RAPID-GROWTH DOUGLAS FIR PULPWOOD (TREE NO. 6, SHIPMENT 1466)

Log Number	Sector Number	Relative height above stump Per Cent	Specific gravity Oven-dry weight per green volume	Density Lb./cu. ft.	Volume of: Springwood Per Cent	Volume of: Heartwood Per Cent	Rate of growth: Rings per inch Number	Rate of growth: Uniformity[1] Per Cent	Radius of sector Inches	Age Years	Knots[2]: Small Number	Knots[2]: Medium Number	Knots[2]: Large Number
1	1	4	0.437	27.3	64	73	7.1	20	11.9				
1	2	4	.411	25.6	72	74	7.7	38	11.3	86	2	0	0
1	3	4	.418	26.1	71	71	8.0	36	10.8				
1	4	4	.422	26.4	71	71	9.0	42	9.8				
7	1	26	.416	26.0	72	64	7.6	49	10.1				
7	2	26	.449	28.1	67	67	7.7	35	10.8	73	2	0	0
7	3	26	.431	26.9	68	69	6.4	36	11.4				
7	4	26	.413	25.8	73	64	7.4	44	10.0				
13	1	48	.411	25.6	74	60	8.1	47	8.3				
13	2	48	.403	25.2	73	61	8.0	57	8.0	62	3	1	0
13	3	48	.389	24.3	77	61	8.0	54	8.0				
19	1	70	.394	24.6	77	50	6.7	37	7.7				
19	2	70	.396	24.7	76	46	6.2	33	8.7	51	2	1	0
19	3	70	.387	24.2	78	49	6.7	31	8.2				
27	1	100	.379	23.7	83	32	7.7	31	4.5				
27	2	100	.381	23.8	81	32	8.7	41	4.2	34	4	10	0

[1] Perfect uniformity of rate of growth equals zero.
[2] Small knots, 1 inch in diameter or less; medium, between 1 and 2 inches; large, over 2 inches in diameter.

TABLE III.—SULPHATE PULPING OF DOUGLAS FIR (PSEUDOTSUGA TAXIFOLIA)—EFFECT OF CAUSTIC—SULPHIDE

Cooking[1] and yield data

Digestion designation, No.	Wood: Moisture, per cent	Wood: Weight: Moist, pounds	Wood: Weight: Oven-dry, pounds	Chemicals: Charged: Concentration: Ratio of NaOH to Na_2S	Chemicals: Charged: Concentration: NaOH, grams per liter	Chemicals: Charged: Concentration: Na_2S, grams per liter	Chemicals: Charged: Concentration: Total, grams per liter	Chemicals: Charged: Concentration: Total effective alkali as NaOH, grams per liter	Chemicals: Charged: Per 100 pounds oven-dry wood: NaOH, pounds	Chemicals: Charged: Per 100 pounds oven-dry wood: Na_2S, pounds	Chemicals: Charged: Per 100 pounds oven-dry wood: Total, pounds	Chemicals: Charged: Per 100 pounds oven-dry wood: Total effective alkali as NaOH, pounds	Chemicals: Charged: Sulphidity,[2] per cent	Chemicals: Consumed: Ratio of combined to total alkali, per cent	Chemicals: Consumed: On oven-dry wood, per cent	Chemicals: Consumed: Total effective alkali as NaOH, per cent	Chemicals: Consumed: Black liquor: Density at 15° C., °B.	Chemicals: Consumed: Black liquor: Total solids, per cent	Chemicals: Consumed: Black liquor: Heat value per pound of oven-dry residue, B.t.u.	Temperature increase period, hours	Duration at maximum temperature 170° C., hour	Yield of oven-dry pulp: Screened, per cent	Yield of oven-dry pulp: Screenings, per cent	Yield of oven-dry pulp: Total, per cent
796				100 per cent NaOH	50.00	0	50.00	50.0	20.00	0	20.00	20.0	0	80.0	16.0	16.0	10.6							50.3	1.3	51.6
797	18.7	4.92	4.0											80.0	16.0	16.0	10.6	14.7	6597	1½	1½	50.1	1.5	51.6
798														80.0	16.0	16.0	10.6					50.1	1.9	52.0
Average														80.0	16.0	16.0	10.6					50.2	1.6	51.7
814														80.8	16.2	16.2	10.6					49.1	1.1	50.2
815	17.6	4.86	4.0	99:1	49.74	0.50	50.24	50.0	19.90	0.20	20.10	20.0	1.03	80.8	16.2	16.2	10.5	14.8	6560	1½	1½	49.8	.9	50.7
816														81.2	16.3	16.2	10.6					49.3	.9	50.2
Average														80.9	16.2	16.2	10.6					49.4	1.0	50.4
802														80.0	16.2	16.0	10.7					48.7	.6	49.3
803	18.0	4.88	4.0	97.5:2.5 (39:1)	49.34	1.26	50.60	50.0	19.74	0.51	20.25	20.0	2.56	80.0	16.2	16.0	10.7	15.3	6793	1½	1½	49.2	.7	49.9
804														80.0	16.2	16.0	10.7					49.8	.6	50.4
Average														80.0	16.2	16.0	10.7					49.2	.6	49.8
772														81.6	16.7	16.3	11.2					47.4	.4	47.8
773	18.7	4.92	4.0	95:5 (19:1)	48.69	2.56	51.25	50.0	19.48	1.03	20.51	20.0	5.12	80.8	16.6	16.2	11.2	16.3	6563	1½	1½	47.6	.5	48.1
774														81.2	16.6	16.2	11.2					47.2	.4	47.6
Average														81.2	16.6	16.2	11.2					47.4	.4	47.8
775														80.8	17.0	16.2	11.2					47.0	.3	47.3
776	17.6	4.86	4.0	90:10 (9:1)	47.30	5.25	52.55	50.0	18.92	2.10	21.02	20.0	10.23	80.8	17.0	16.2	11.2	16.3	6576	1½	1½	48.1	.3	48.4
777														80.8	17.0	16.2	11.2					47.5	.3	47.8
Average														80.8	17.0	16.2	11.2					47.5	.3	47.8
781														81.2	18.0	16.2	11.5					46.1	.2	46.3
782	18.5	4.91	4.0	80:20 (4:1)	44.30	11.07	55.37	50.0	17.72	4.43	22.15	20.0	20.40	80.8	17.9	16.2	11.6	16.5	6410	1½	1½	46.9	.2	47.1
783														81.6	18.1	16.3	11.3					47.1	.2	47.3
Average														81.2	18.0	16.2	11.5					46.7	.2	46.9
841														82.8	18.3	16.6	11.2					45.5	0.3	45.8
842	18.5	4.91	4.0	80:20 (4:1)	44.30	11.07	55.37	50.0	17.72	4.43	22.15	20.0	20.40	82.8	18.3	16.6	11.2	16.2	6682	1½	1½	46.1	.3	46.4
843														82.8	18.3	16.6	11.2					45.9	.2	46.1
Average														82.8	18.3	16.6	11.2					45.8	.3	46.1
784														80.4	18.3	16.1	11.9					45.6	.2	45.8
785	17.7	4.86	4.0	75:25 (3:1)	42.70	14.22	56.92	50.0	17.08	5.69	22.77	20.0	25.50	80.4	18.3	16.1	11.8	17.1	6439	1½	1½	45.5	.2	45.7
786														80.4	18.3	16.1	11.9					45.8	.1	45.9
Average														80.4	18.3	16.1	11.9					45.6	.2	45.8
793														81.6	19.5	16.3	12.0					44.8	.2	45.0
794	17.9	4.87	4.0	66.7:33.3 (2:1)	39.80	19.90	59.70	50.0	15.92	7.96	23.88	20.0	33.85	81.6	19.5	16.3	12.0	17.3	6414	1½	1½	44.7	.2	44.9
795														81.6	19.5	16.3	12.1					44.9	.1	45.0
Average														81.6	19.5	16.3	12.0					44.8	.2	45.0
808														82.4	21.8	16.5	12.3					45.5	.1	45.6
809	18.8	4.92	4.0	50:50 (1:1)	33.05	33.05	66.10	50.0	13.22	13.22	26.44	20.0	50.50	82.4	21.8	16.5	12.3	18.6	6109	1½	1½	45.5	.2	45.7
810														82.4	21.8	16.5	12.3					45.3	.1	45.4
Average														82.4	21.8	16.5	12.3					45.4	.1	45.6
805														83.6	24.8	16.7	13.0					45.1	.1	45.2
806	15.7	4.75	4.0	33.3:66.7 (1:2)	24.68	49.36	74.04	50.0	0.87	19.74	29.61	20.0	67.23	83.6	24.8	16.7	13.0	19.5	5790	1½	1½	45.3	.2	45.5
807														83.6	24.8	16.7	13.0					45.1	.2	45.3
Average														83.6	24.8	16.7	13.0					45.2	.2	45.3
790														84.8	26.7	17.0	13.6					44.7	.2	44.9
791	18.9	4.93	4.0	25:75 (1:3)	19.70	59.10	78.80	50.0	7.88	23.63	31.51	20.0	75.48	84.8	26.7	17.0	13.6	20.6	5598	1½	1½	44.6	.2	44.8
792														84.8	26.7	17.0	13.6					45.2	.2	45.4
Average														84.8	26.7	17.0	13.6					44.8	.2	45.0
778														83.2	27.3	16.6	13.8					44.5	.2	44.7
779	16.0	4.76	4.0	20:80 (1:4)	16.38	65.52	81.90	50.0	6.55	26.21	32.76	20.0	80.40	83.2	27.3	16.6	13.8	20.8	5548	1½	1½	44.3	.1	44.4
780														83.2	27.3	16.6	13.8					44.9	.2	45.1
Average														83.2	27.3	15.5	13.8					44.6	.2	44.7
1075														84.4	27.6	16.9	14.3					44.5	.4	44.9
1076	11.3	4.51	4.0	20:80 (1:4)	16.38	65.52	81.90	50.0	6.55	26.21	32.76	20.0	80.40	84.4	27.6	16.9	14.4	20.5	5747	1½	1½	44.1	.3	44.4
1077														84.4	27.6	16.9	14.4					45.2	.2	45.4
Average														84.4	27.6	16.9	14.4					44.6	.3	44.9
769														84.8	33.1	17.0	15.5					44.9	.2	45.1
770	18.1	4.88	4.0	100 per cent Na_2S	0	97.50	97.50	50.0	0	39.00	39.00	20.0	100.0	84.8	33.1	17.0	15.2	22.8	5114	1½	1½	45.0	.3	45.3
771														84.8	33.1	17.0	15.2					45.1	.2	45.3
Average														84.8	33.1	17.0	15.3					45.0	.2	45.2

[1] All digestions were made in 3.7 gallon, steam-jacketed, spherical, rotary autoclaves heated indirectly with steam. With the exception of sulphidity or ratio of caustic soda to sodium sulphide and such other variables that necessarily change with variation of this ratio, all digestions were made under the same conditions as follows:

Total active or "effective" alkali added per hundred pounds of oven-dry wood charged (Calculated as NaOH + 0.513 Na_2S)..... 20.0 pounds
Total volume of cooking liquor (including moisture in chips) charged per hundred pounds of oven-dry wood ..... 48.0 gallons

RATIO ON YIELD AND PULP PROPERTIES (YOUNG, RAPID-GROWTH WOOD TAKEN FROM AN ENTIRE TREE)

Test beater strength data on unbleached pulps
Tests made at 72° F. and 65 per cent relative humidity

Digestion designation	Time of treatment, min.	Freeness (Schopper) (1) Cc.	Freeness (Schopper) (2) Cc.	Ream weight, 25" x40"—500 (1) Pounds	Ream weight, 25" x40"—500 (2) Pounds	Burst factor (Mullen) (1) Points per lb. per ream	Burst factor (Mullen) (2) Points per lb. per ream	Tear factor (1)	Tear factor (2)	Folding endurance (1) Double folds	Folding endurance (2) Double folds	Tensile strength (1) Pounds per square inch	Tensile strength (2) Pounds per square inch	Solid fraction (1) Ratio	Solid fraction (2) Ratio	Stretch (1) Per cent	Stretch (2) Per cent	Bleach requirement: Standard bleach added, per cent	Ives reading: Red, parts	Ives reading: Green, parts	Ives reading: Blue, parts	Chemical analysis: Cellulose, Total, per cent	Cellulose, Alpha, per cent	Lignin, per cent	Total pentosans, per cent	Chlorine number (Roe), per cent
796	0	890	890	...	...	...	...	...	...	...	...	...	...	...	...	...	...									
797	20	850	860	58.6	59.1	0.63	0.62	2.8	2.8	475	....	2,615	2,840	0.30	0.31	5.0	5.3	0	33	21	16	86.4	73.8	11.1	6.8	12.8
798	40	795	805	56.1	54.5	.92	.84	2.6	2.5	1,315	....	4,260	4,875	.35	.36	6.5	7.5	20	45	30	21					
	60	600	615	55.7	55.3	1.06	1.02	2.1	2.2	1,975	....	5,580	6,450	.40	.41	6.0	6.8	25	47	33	23					
	80	405	410	53.7	53.9	1.12	1.12	1.6	1.7	2,046	....	7,900	7,000	.44	.45	6.0	6.0	30	51	36	26					
814	0	875	875	...	...	...	...	...	...	...	...	...	...	...	...	...	...									
815	20	860	860	55.1	65.1	.72	.58	3.2	2.8	....	....	3,250	3,860	.34	.31	6.0	6.6	0	35	22	18	88.4	75.3	10.5	8.0	11.3
816	40	780	775	55.4	53.1	.92	.88	2.5	2.8	....	....	4,985	4,800	.36	.36	6.5	7.4	20	50	32	23					
	60	580	590	55.4	54.2	1.11	1.01	2.1	2.3	....	....	6,070	5,880	.41	.41	7.0	6.3	25	53	35	25					
	80	375	385	55.9	53.2	1.10	1.11	1.8	1.7	....	....	7,240	6,650	.44	.46	5.4	5.3	30	55	37	27					
802	0	880	880	...	...	...	...	...	...	...	...	...	...	...	...	...	...									
803	20	860	860	56.4	56.2	.68	.74	3.3	3.0	1,032	645	3,090	3,375	.31	.33	5.3	5.5	0	35	23	18	88.8	75.8	9.3	6.3	10.4
804	40	795	780	54.5	56.1	.94	.94	2.8	2.6	2,866	1,273	4,275	5,060	.36	.37	6.8	6.3	20	51	34	25					
	60	625	615	57.8	51.0	1.07	1.02	2.4	2.7	2,760	1,295	5,640	6,250	.40	.40	6.8	5.3	25	54	38	27					
	80	415	415	53.7	55.7	1.06	1.17	1.9	1.7	1,793	1,409	6,760	7,150	.44	.44	5.5	4.5	30	58	45	33					
772	0	880	880	...	...	...	...	...	...	...	...	...	...	...	...	...	...									
773	20	845	840	53.2	58.0	.73	.64	2.8	3.3	....	....	3,815	3,825	.37	.35	...	5.1	0	38	26	20	92.2	78.0	5.9	6.9	8.0
774	40	770	765	55.9	52.3	.98	1.01	2.8	3.1	....	....	5,300	4,180	.42	.39	...	7.6	25	63	46	33					
	60	615	610	52.8	53.2	1.13	1.06	2.6	2.8	....	....	6,930	5,700	.45	.42	...	9.3	30	70	53	40					
	80	415	435	53.2	53.9	1.26	1.17	2.2	2.5	....	....	8,380	6,880	.47	.45	...	7.4	35	75	60	47					
	100	275	295	52.0	52.3	1.28	1.22	2.0	2.1	....	....	9,500	7,260	.50	.46	...	6.5									
775	0	885	885	...	...	...	...	...	...	...	...	...	...	...	...	...	...									
776	20	850	845	50.7	53.9	.79	.88	3.5	3.0	....	1,533	3,600	4,410	.34	.36	5.5	5.5	0	37	26	21	93.2	78.4	4.5	6.7	6.2
777	40	760	765	49.8	55.9	.96	1.07	3.3	3.3	....	2,156	5,020	4,975	.39	.39	7.4	8.5	25	70	55	43					
	60	595	600	54.2	52.8	1.22	1.20	3.1	3.0	....	2,564	5,870	5,730	.42	.44	8.0	9.4	30	78	65	52					
	80	420	430	57.0	52.4	1.24	1.28	2.6	2.7	....	2,467	6,525	7,080	.46	.46	8.0	7.5	35	80	71	59					
	100	270	285	54.2	53.9	1.31	1.33	2.1	2.7	....	2,209	8,010	8,370	.49	.49	7.1	7.0									
781	0	900	900	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0	37	26	21					
782	20	855	845	61.6	55.7	.93	.89	4.0	4.0	2,184	1,974	3,930	4,900	.35	.38	5.0	5.5									
783	40	765	760	57.6	59.2	1.14	1.19	3.2	3.2	3,638	1,646	5,760	6,430	.38	.41	5.5	5.3									
	60	605	615	53.2	58.9	1.29	1.27	2.7	2.6	4,099	3,479	7,900	7,950	.42	.42	6.8	6.5									
	80	405	405	57.2	56.4	1.41	1.37	2.4	2.4	4,692	3,158	8,600	7,300	.47	.47	6.0	5.0									
841	0	870	870	...	...	...	...	...	...	18	...	...	...	...	...	...	...	0	42	31	24	94.7	82.4	2.1	7.4	4.0
842	20	840	840	60.8	56.7	0.85	0.86	3.5	3.4	3,513	1,994	4,350	4,415	0.33	0.34	7.5	8.3	25	80	69	61					
843	40	755	755	54.5	55.9	1.12	1.19	3.3	2.7	3,108	2,910	4,920	6,040	.36	.40	7.3	8.3	30	85	77	68					
	60	595	595	55.4	55.1	1.24	1.28	2.7	2.6	3,614	3,047	6,450	6,790	.41	.44	7.5	7.5	35	88	81	77					
	80	415	430	53.5	52.9	1.35	1.30	2.2	2.0	3,585	4,432	7,850	9,400	.46	.46	7.5	7.3									
784	0	900	900	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0	39	28	22	95.4	81.4	2.5	7.5	4.1
785	20	845	840	63.3	60.8	.87	.83	3.7	3.6	2,266	623	4,490	4,770	.35	.35	7.0	6.5	25	85	74	64					
786	40	755	755	63.9	55.4	1.12	1.10	2.9	3.2	2,131	1,157	4,750	5,570	.36	.39	7.3	6.8	30	87	79	70					
	60	595	605	63.0	55.7	1.18	1.33	2.7	2.6	2,865	1,892	6,100	7,340	.41	.42	7.0	7.3	35	90	84	78					
	80	415	410	55.4	58.0	1.32	1.33	2.2	2.5	2,610	2,575	7,850	8,800	.44	.45	6.5	6.8									
793	0	875	875	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0	38	27	22	95.8	83.1	1.8	6.9	4.0
794	20	830	835	57.6	57.0	.96	.99	3.3	3.4	937	1,049	4,530	3,715	.34	.33	6.3	6.3	20	80	69	59					
795	40	695	695	57.6	56.1	1.21	1.27	2.9	3.0	3,033	1,488	6,980	6,210	.41	.40	8.0	8.0	25	85	87	68					
	60	470	460	54.5	55.7	1.37	1.33	2.5	2.3	2,105	1,772	8,700	8,500	.45	.44	6.5	6.3	30	87	81	73					
	80	290	285	54.2	53.1	1.31	1.30	1.8	1.7	2,561	2,553	8,400	9,420	.46	.50	6.3	6.0									
808	0	865	865	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0	39	29	23	95.1	80.8	.9	6.7	3.9
809	20	840	835	57.3	57.5	.90	.91	3.8	3.7	2,230	1,107	3,510	4,760	.32	.36	5.8	8.0	20	80	69	58					
810	40	750	750	57.2	56.5	1.17	1.14	3.2	3.2	3,114	1,622	5,340	5,800	.38	.39	6.8	9.0	25	87	77	70					
	60	580	585	55.9	56.1	1.32	1.30	2.6	2.6	2,784	2,012	5,700	7,440	.42	.43	8.0	7.0	30	87	81	74					
	80	395	390	57.6	54.5	1.31	1.31	2.0	2.2	3,346	2,764	9,320	8,620	.48	.45	5.3	5.5									
805	0	880	880	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0	37	27	21	95.2	81.1	1.7	6.5	3.8
806	20	850	840	56.9	56.5	.92	.87	3.6	3.7	1,627	....	4,330	4,475	.37	.36	6.5	6.4	20	81	71	59					
807	40	740	730	54.2	51.5	1.20	1.27	3.3	3.1	1,825	....	5,570	6,700	.38	.41	7.5	8.3	25	89	79	71					
	60	570	575	52.1	53.7	1.46	1.38	2.5	2.7	1,592	....	7,460	7,770	.43	.43	6.3	8.3	30	89	81	76					
	80	375	365	50.4	53.9	1.34	1.36	2.0	2.0	1,781	....	8,500	10,160	.49	.49	5.5	6.8									
790	0	895	895	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0	36	26	21	95.7	83.9	1.4	7.2	3.5
791	20	820	830	53.5	55.7	.96	.98	3.6	3.7	2,925	2,661	4,540	5,220	.35	.36	5.5	6.5	20	81	71	62					
792	40	670	680	57.0	54.6	1.21	1.21	3.1	3.2	4,677	2,442	6,680	7,220	.40	.41	7.0	7.0	25	86	77	70					
	60	430	490	58.9	55.6	1.39	1.32	2.4	2.3	3,768	2,910	8,620	8,950	.43	.44	7.0	6.3	30	88	83	78					
	80	275	275	54.3	51.3	1.33	1.33	1.9	1.7	3,976	4,338	8,900	8,860	.48	.49	6.3	7.0									
778	0	880	880	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0	38	27	21					
779	20	850	830	63.6	61.7	.93	.91	3.1	3.1	....	....	4,070	4,360	.36	.37	5.6	8.8									
780	40	770	750	56.7	59.7	1.06	1.08	3.0	2.9	....	....	5,460	5,280	.41	.37	8.9	8.3									
	60	620	560	59.5	59.5	1.19	1.24	2.9	2.6	....	....	6,010	6,080	.42	.42	10.5	7.0									
	80	450	410	54.8	58.6	1.22	1.34	2.5	2.0	....	....	6,810	9,030	.44	.46	7.4	6.5									
	100	295	285	52.6	57.6	1.22	1.28	2.1	1.8	....	....	8,790	9,280	.48	.49	6.6	6.0									
1075	0	890	...	58.3	...	.33	...	2.1	..	....	....	1,340	....	.27	...	3.0	...	0	35	25	21	96.1	82.1	2.0	6.8	3.4
1076	20	850	860	56.7	54.0	.72	.73	3.6	4.0	....	....	3,615	3,435	.34	.36	6.3	6.8	25	86	80	70					
1077	40	790	795	57.0	52.9	.96	1.01	3.1	3.6	....	....	4,700	5,490	.40	.41	6.5	5.8	30	88	82	74					
	60	665	660	55.1	54.3	1.09	1.13	2.8	3.0	....	....	6,640	5,620	.44	.43	7.3	7.3	35	89	82	77					
	80	495	510	55.3	54.0	1.14	1.17	2.1	2.3	....	....	8,100	7,400	.49	.47	6.0	6.0									
	100	335	345	54.6	53.9	1.16	1.11	1.6	1.6	....	....	9,430	8,415	.55	.51	6.5	6.3									
769	0	890	890	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0	33	23	19	94.4	81.1	2.1	7.1	4.0
770	20	840	840	59.1	57.5	.93	.81	3.5	3.6	....	....	4,450	3,970	.39	.37	7.3	7.8	25	83	75	66					
771	40	780	795	57.9	58.3	1.09	1.00	3.4	3.3	....	....	5,630	4,670	.41	.41	7.6	7.1	30	86	81	73					
	60	690	690	55.9	53.9	1.22	1.20	3.3	3.4	....	....	6,550	6,620	.44	.43	7.6	7.1	35	87	82	77					
	80	520	530	56.3	56.3	1.29	1.32	3.3	3.0	....	....	8,240	7,410	.46	.45	6.3	9.3									
	100	395	405	55.1	55.5	1.37	1.35	2.8	2.8	....	....	7,950	9,080	.49	.47	7.3	6.5									

Liquor-wood ratio 4:1
Maximum digestion temperature ..... 170° C.

[1] Per cent sulphidity = $\frac{Na_2S \text{ (calculated as } Na_2O)}{NaOH + Na_2S \text{ (both calculated as } Na_2O)}$

lowed to raise the temperature of the autoclave from that of the room to the maximum of 170 deg. C., where it was held for 1½ hours, making a total cooking cycle of 3 hours. Upon completion of this schedule, the jacket-steam pressure was released and the autoclaves were rapidly cooled to atmospheric pressure by admitting cold water into the jackets of the autoclaves. The pulped chips were then dumped into screened boxes, washed to remove superficial spent agitation.

The pulps were washed to remove the remaining spent liquors and then screened through a 12-cut flat screen.

The screened pulps were pressed to approximately 33 per cent oven dryness, sampled for moisture, and weighed in closed vessels for the determination of yield. In order to have ample material for duplicate physical and chemical tests, the three similar digestions were combined by thorough agitation in water suspension. The combined mass of pulp was again pressed to an oven dryness of approximately 33 per cent and stored in airtight cans until tested.

Calculations

All calculations of chemicals and yields were based on the calculated weight of the oven-dry chips charged. Bleach consumption and the results of chemical analysis, on the other hand, were calculated on the weight of the oven-dry pulp tested.

Method of Testing the Pulps

The strength properties of the pulps were determined on test sheets prepared after processing 360-gram (oven-dry basis) portions in 23 liters of water for definite intervals in a 1½-pound standard testing beater provided with a 6,500-gram weight on the bedplate. Bleaching tests were made on the pulps by treating 15-gram samples by a single-stage method with measured quantities of calcium hypochlorite solution.

The color of the bleached and unbleached pulps was determined by comparison with a standard white magnesia block in an Ives tint photometer.

Samples of the unbleached pulps were analyzed for their cellulose, alpha-cellulose, lignin, and pentosan contents and for their chlorine-absorbing power according to standard methods adopted by the Forest Products Laboratory.

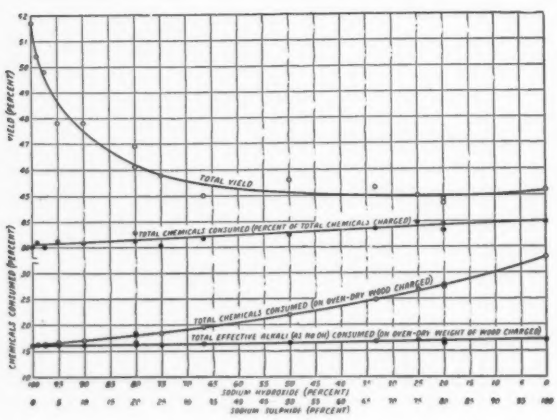
TOTAL YIELD
TOTAL CHEMICALS CONSUMED (PERCENT OF TOTAL CHEMICALS CHARGED)
TOTAL CHEMICALS CONSUMED (ON OVEN-DRY WOOD CHARGED)
TOTAL EFFECTIVE ALKALI (AS Na2O) CONSUMED (ON OVEN-DRY WEIGHT OF WOOD CHARGED)
SODIUM HYDROXIDE (PERCENT)
SODIUM SULPHIDE (PERCENT)

FIG. 1.

Effect of Sulphidity on Yield of Pulp and Chemical Consumption in Pulping Douglas Fir.

Results and Discussion

Yield of Pulp and Chemical Consumption

According to the data recorded in Table 3 and plotted graphically in Fig. 1, the total yield of pulp decreased rapidly from 51.7 to 45.0 per cent as the sulphidity of the cooking liquors was increased from zero to 34 per cent, even though the total available alkali (sodium hydroxide) content of the liquors was initially the same. This increased activity of cooking liquors containing sodium sulphide over those containing caustic soda alone indicates that the sulphide or hydro-sulphide ion has some specific effect on the delignification or pulping reaction. This chemical may react either as a buffering agent, releasing more caustic soda as it is consumed, as a reducing agent, or as a substance exhibiting a high reactivity toward lignin, but hardly as a catalyst as the amounts required are too large to be accounted for from this standpoint.

Since further increases in sulphidity (from 34 to 100 per cent) result in only small changes in yield and pulp quality, it appears that its buffering properties and its high reactivity toward lignin are the chief functions of this chemical in pulping. The results obtained in these experiments, while in accord with Kullgren, *(5)* are contrary to those published by Kress and McGregor, *(3)* who, through replacing caustic soda with sodium sulphide pound for pound without regard for the alkalinity of the resulting cooking liquors, reported practically no cooking action below the customary 2 to 1 ratio of caustic soda to sodium sulphide, respectively.

If free caustic soda is conceded to be the chief pulping agent in sulphate cooking liquors, then the percentage of active cooking agent (sodium hydroxide) in Kress's and McGregor's *(3)* pure sodium sulphide digestion was only 10.26 per cent. *(6)* It is a well-known fact that very little pulping will be accomplished even with straight kraft liquors of any degree of sulphidity with only slightly more than 10 per cent of total chemicals. Hence, the raw pulps obtained by these investigators.

The digestion made at zero sulphidity or, in other words, with caustic soda alone, gave the highest percentage of screenings (1.6 per cent). Introduction of only 1 per cent of sodium sulphide resulted in a noticeable decrease (from 1.6 to 1.0 per cent in screenings. Further increases in sulphidity showed a gradual decrease in screenings to 0.1 per cent for the 1 to 1 ratio of the two chemicals. The percentage of screenings increased but slightly to only 0.2 per cent in pulping with 100 per cent sodium sulphide solution. Visually the unbleached pulps showed a gradual decrease in rawness as the sulphidity was increased from 0 to 50 per cent.

The consumption of chemicals based on the percentage of total chemicals added increased from 80 to 84.9 per cent in increasing the sulphidity from zero to 100 per cent. Based on the oven-dry weight of wood charged, the percentage of chemicals consumed increased from 16 to 33 per cent for like changes in sulphidity. The total effective alkali or sodium hydroxide consumption, however, showed only the very slight increase of 1 per cent (from 16 to 17 per cent) as a result of increasing sulphidity from zero to 100

per cent even though the total charge of chemicals expressed as the sum of sodium hydroxide and sodium sulphide was increased from 20 to 39 per cent.

Pulp Quality—Chemical

The data plotted in Fig. 2 show the effect of varying the sulphidity on the chemical properties of the resulting pulps.

Upon increasing the sulphidity from zero to approximately 20 per cent the percentage of total— and alpha-cellulose in the pulps, the lignin content, and their chlorine absorption power (Roe number) show rather marked and rapid changes. Further increases in sulphidity even up to 100 per cent show very little change in the chemical composition of the resulting pulps.

These differences in chemical composition are reflected both in the texture and in the color of the unbleached pulps and also in their bleach requirement. The pulps obtained with caustic soda alone and with sulphate liquors up to 10 per cent sulphidity appeared to be coarse and raw. With sulphate liquors ranging between 10 and 50 per cent sulphidity, the unbleached pulps became softer and lighter in color. Beyond this point the color change tended toward slightly darker pulps, but even so the color and texture of the unbleached pulps prepared with 100 per cent sodium sulphide were much better than any of those prepared with liquors of lower than 10 per cent sulphidity.

The results obtained upon bleaching these pulps by a single-stage method with different amounts of hypochlorite solution are recorded in Table III. Upon plotting (Fig. 2) the Ives blue color readings resulting from the 25 per cent single-stage bleaching treatment against the sulphidity of the cooking liquors, a marked change in whiteness may be noticed as the sulphidity is increased from zero to approximately 34 per cent. Further increases in sulphidity up to 80 per cent show only slight changes in pulp whiteness. In pulping with a solution of pure sodium sulphide a small decrease (darkening) in color of the bleached pulp may be noticed. From these data

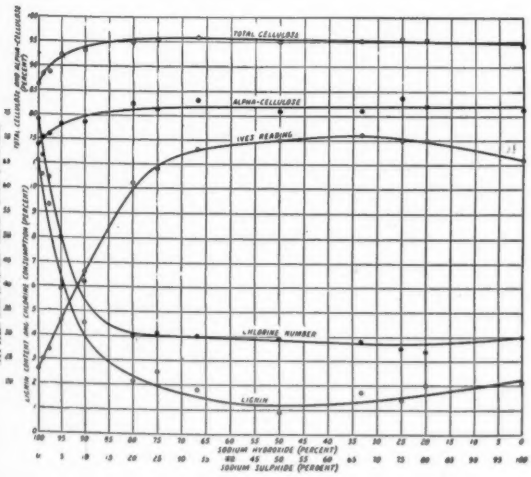

Fig. 2.

Effect of Sulphidity on Chemical Properties and Bleach Requirement of Douglas Fir Pulps.

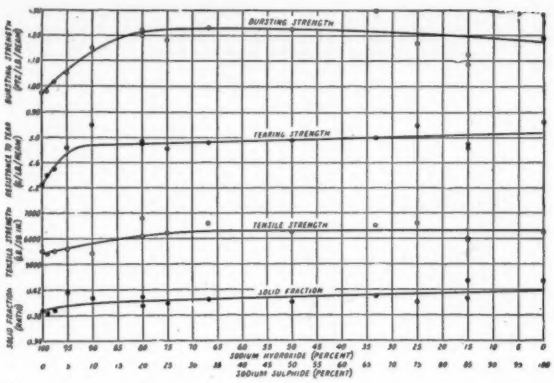

Fig. 3.

Effect of Sulphidity on the Strength Properties of Douglas Fir Pulps at 700 cc. Freeness (Schopper-Riegler).

it may be concluded that in pulping with sulphate liquors of 20 per cent free alkali content (caustic soda), sulphidities ranging between 33 and 80 per cent are most suitable for the production of pulps of minimum bleach requirement; but the improvement in color with sulphidities higher than 33 per cent is so small that it is questionable whether it is economical to go beyond the minimum figure.

Pulp Quality—Physical

The physical or strength properties of the several pulps, as recorded in Table III and plotted graphically for one particular freeness value (700 cc. S. R.) in Fig. 3, show small but nevertheless definite increases as a result of varying the sulphidity of the cooking liquors. Most of these increases in strength, however, take place in a rather limited range of sulphidity, namely, between zero to 20 per cent. Beyond this point the several strength qualities of the pulps showed little variation, the data being well within the error of experiment. The greatest change in strength as a result of replacing caustic soda with sodium sulphide is found in the bursting strength of the Douglas fir pulps prepared with liquors ranging between zero and 20 per cent sulphidity. Here an increase of 20 per cent in bursting strength was found. With further increases in sulphidity, the bursting strength values of the pulps were practically unchanged. The other strength factors show about the same trend.

Sulphidity Over Wide Range Possible

While the sulphate digestion is shown to be superior to the soda process for pulping Douglas fir, variation of sulphidity over a wide range is possible without adversely affecting the yield or quality of the pulps, provided the cooking liquors contain sufficient free alkali to pulp the wood completely.

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The Determination of Methoxyl Groups In Pulp and Plant Materials

By Quinton P. Peniston[1] and Harold Hibbert[2]

Abstract

A proposed procedure for determining methoxyl groups, based on the adaptation of the Vieböck-Schwappach method.

The evaluation of the degree of removal of the noncellulosic materials from wood pulp at various stages of purification is beset with several inherent difficulties. Methods based on chlorination do not clearly differentiate between the oxidation of carbohydrate material, and the chlorination and oxidation of ligneous material. This is, also, true of permanganate, nitric acid, and similar bleachability tests.

The lignin determination, long called the "bête noir" of wood chemistry (*1*), is often of limited applicability and difficult interpretation. Aside from error introduced by factors such as the humification of carbohydrates, the presence of resins, etc. (*2*), it is now apparent that, especially in semibleached pulps, relatively large percentages of the ligneous impurities can exist in a degraded state, such that, they are not determined by the usual 72 per cent sulphuric acid lignin determination (*3*). It is most probable that the methoxyl in holocellulose, reported by Ritter and Kurth (*4*), is indicative of the products of this nature. These lignin degradation products are of prime importance in the manufacture of high grade bleached pulps, because such factors as color, aging qualities, and particularly the suitability of the pulp as a chemical raw material for the various synthetic textile and plastic industries, are dependent on their elimination.

The determination of methoxyl groups furnishes a valuable aid, both as a control and a research method, in the study of the removal of these substances in the bleaching and refining processes. Although the quantitative evaluation of lignin degradation products from methoxyl analysis is not possible at present, it is hoped that investigations now in progress will supply information regarding these substances.

Unfortunately, the determination of small amounts of methoxyl in pulps has been a difficult task, limiting the usefulness of this approach to the problem. The present TAPPI Standard T 209 M-34, is an adaptation of the original Zeisel method (*5*), and has the inherent difficulties of this procedure. The analysis is tedious and time consuming; requires rigorously purified reagents, especially the hydriodic acid and the alcoholic silver nitrate and, unless, painstakingly conducted by an expert analyst, it will not yield results of a high degree of accuracy.

Since the development of the present TAPPI standard method, there has appeared an adaptation of the Leipert volumetric iodine determination (*6*) developed by Vieböck and Schwappach (*7*), and Vieböck and Brecher (*8*), to the determination of methoxyl groups, which removes many of the difficulties of the Zeisel method, and, which has been widely adapted, both as a semimicro and a micro method, for general organic analysis. The modification involves the volumetric determination of iodine, as iodate, according to the reactions:

$$Br_2 + CH_3I \rightarrow CH_3IBr_2 \rightarrow CH_3Br + IBr$$
$$IBr + 2Br_2 + 3H_2O \rightarrow HIO_3 + 5HBr$$
$$HIO_3 + 5HI \rightarrow 3I_2 + 3H_2O$$

as explained by Vieböck and Schwappach (*7*). This procedure possesses the inherent advantage of a high titration factor, and for this reason, is far superior to other volumetric procedures, such as, that of Kirpal and Bühn (*9*), which depend on the titration of iodide. Other advantages of this procedure lie in its relative insensitiveness to impurities arising, either from the sample or the reagents. Thus phosphine and hydrogen sulphide do not affect results to the extent encountered in the Zeisel procedure. This permits the use of less rigorously purified hydriodic acid and, also, allows the determination of methoxyl in sulphur containing compounds, (sulphate pulp, sulphite pulp). It is also possible to run several determinations with a single charge of hydriodic acid, thus reducing the cost of the determination.

Considerable work has been done in this laboratory on the adaptation of the Vieböck-Schwappach method to the determination of methoxyl groups in pulp, resulting in the development of a simple procedure, easily within the grasp of the average analyst, and capable of a high degree of accuracy on pulp samples containing as little as 0.04 per cent methoxyl.

Apparatus

The apparatus, Fig. 1, used is made up of the following units:

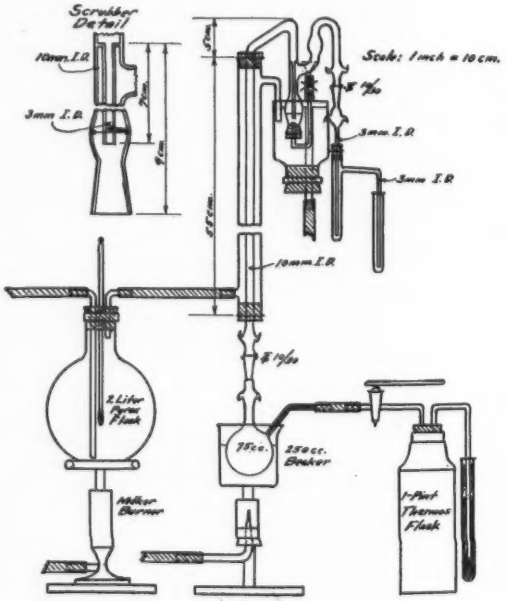

FIG. 1.
Apparatus for the Determination of Methoxyl Groups in Pulp

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The carbon dioxide source, found to be the most satisfactory in these laboratories, is a dry ice container, consisting of a commercial, pint-capacity, thermos flask, equipped with a mercury seal and pressure regulator, as recommended by Hershberg and Wellwood (*10*). With this apparatus no purification or drying of the carbon dioxide is necessary (*11*). Solid carbon dioxide, in a cloth bag, is broken up into small pieces to conveniently fill the thermos bottle. A single charge lasts from two to three days and a constant head of carbon dioxide is maintained by the mercury seal. A high head Kipp generator is probably, equally satisfactory but requires a concentrated sulphuric acid scrubber to remove the acid mist and water. The carbon dioxide rate is best adjusted, by means of a notched stopcock with a long handle, to about 70 bubbles a minute through the scrubber.

The round bottom distilling flask is of 75 cc. volume and has a capillary side arm attached below the neck for introduction of the carbon dioxide. The connection to the distilling column is by means of a micro burner, drawn from glass tubing and provided with a shield. A precision micro screw clamp is used to control the gas rate.

The distilling column and scrubber combine features of the semi-micro apparatus of E. P. Clark (*12*), with that recommended by M. W. Bray in the present TAPPI standard method. It is illustrated to scale in Fig. 1. The design of the apparatus is not rigorous and the apparatus recommended in the TAPPI standard method should be equally acceptable.

The heating jacket and water reservoir are the same as used in the TAPPI standard method.

The receiver consists of an inlet tube with a 10/30 standard taper ground glass connection to the column, and two 1.5 x 12 cm. test tubes, one of which has a bent side arm extending to the bottom of the second. A rubber stopper is used between the inlet tube and the first receiver.

Reagents

(1) Carbon Dioxide: Dry ice, as already described.
(2) Hydriodic Acid: sp. gr. = 1.7, redistilled from red phosphorus as recommended by Bray, TAPPI Standard T. 209m-34. The hydriodic acid need not be of as high a degree of purity as is required for the gravi-metric method, because the absorbing solution is not affected by small amounts of hydrogen sulphide or phosphine. The best grades of reagent hydriodic acid, if freshly prepared by the manufacturer and stored in absence of light at low temperature, can be used without redistillation.
(3) Nichrome wire: 18-24 gage, a length of about one cm. is bent into a small loop and put into the distilling flask to prevent bumping.
(4) Phenol: Merck "Silver Label" or equivalent.
(5) Cadium Sulphate: 5 per cent aqueous solution.
(6) Sodium Thiosulphate: 5 per cent aqueous solution.
(7) Potassium Acetate: 10 per cent in glacial acetic acid. Make up to approximate strength by dissolving 100 g. of potassium acetate in one liter of reagent grade glacial acetic acid. Traces of moisture are not significant.
(8) Bromine C.P.: Keep in a 50 cc. bottle equipped with a dropping pipette.
(9) Sodium Acetate: 25 per cent solution, approximate strength only.
(10) Formic Acid: Analytical grade, keep in a dropping indicator bottle.
(11) Sodium Thiosulphate: Standard solution, 0.02 normal.
(12) Potassium Iodide: 10 per cent solution.
(13) Sulphuric Acid: 10 per cent.
(14) Starch: Indicator solution.

Procedure

The charge in the distilling flask is made up of one cm. length of nichrome wire to prevent bumping, 7.5 g. phenol (crushed and melted in a beaker) and fifteen cc. of hydriodic acid.

The charged distilling flask is connected to the apparatus and the scrubber is filled with about 4 cc. of a mixture of equal volumes of 5 per cent cadmium sulphate and 5 per cent sodium thiosulphate: the liquid level should cover the gas inlet tube to a depth of about 4 mm. The water reservoir temperature is regulated to 45-55 deg. C. and the carbon dioxide rate is adjusted to about 70 bubbles per minute through the scrubber. The apparatus is then "burnt out" by heating the oil bath at 130-135 deg. C. for 30 to 45 minutes.

The distilling flask is now allowed to cool below 100 deg. C. The absorbing solution is made up in a ten cc. graduated cylinder by adding 7 to 8 drops of bromine to 10 cc. of 10 per cent potassium acetate in glacial acetic acid. After mixing, 6 cc. of this solution are poured into the first receiver and the remainder into the second. The receivers are then connected to the apparatus and the ground glass joint is sealed with a drop of water from a glass rod. The carbon dioxide rate is readjusted to 70 bubbles per minute.

The distilling flask is now removed and the sample is introduced. For pulp samples 0.1 to 0.5 g. may be used depending on the methoxyl content. Woodmeal samples should be smaller, 0.1 to 0.2 g. The sample may be introduced in the form of pills, after predetermining the moisture content on the pills, or the powdered sample may be pushed into the flask from a piece of glass tubing with a glass rod, determining the sample weight by difference.

The distilling flask is immediately reconnected to the column, sealing the ground glass joint with a drop of molten phenol from a glass rod, and the heating bath is brought to 130-135 deg. C. Distillation should proceed for from 50 to 70 minutes. With a fresh charge of hydriodic acid, 50 minutes is ample; after two large samples have been analyzed (0.3 g.), 70 minutes may be required.

At the end of the distillation the receiver tubes are removed and the absorbing solution is quantitatively transferred with distilled water into a 250 cc. Erlenmeyer flask containing five cc. of 25 per cent sodium acetate. The solution is made up with distilled water to approximately 100 cc. Formic acid is now added dropwise, with shaking, until the yellow color disappears. Six drops are usually required. Twelve additional drops of formic acid are now added, with shaking, and the solution is allowed to stand for two minutes. The absence of bromine can be proven by adding a drop of methyl red which is immediately decolorized by bromine. This procedure is not recommended, except as an occasional check on the formic acid, because the pink color masks the iodine endpoint with the starch indicator.

After two minutes standing, 10 cc. of 10 per cent sulphuric acid and 10 cc. of 10 per cent potassium iodide are added, and the solution is titrated with standard sodium thiosulphate, adding 1 cc. of starch indicator solution just before the endpoint is reached.

Calculation: per cent CH_3O =

$$\frac{\text{(cc. thiosulphate) (normality) (31.02) (100)}}{\text{(dry weight of sample g.) (1000) (6)}}$$

Notes on Operation

Blank Determinations

A small blank amounting to 0.1 to 0.2 cc. of 0.02 normal sodium thiosulphate is encountered. The value of the blank varies with the quality of the hydriodic acid, the time of heating, the carbon dioxide rate, the column and scrubber temperature, and the number and size of samples used per charge of hydriodic acid. For high accuracy, blanks should be determined, both before and after three samples have been run in the distilling flask. The blanks should be conducted exactly as a normal determination. The values sub-

tracted from the titration of the samples should then be the average of the two blank values. Clark (*13*) notes that a blank may arise from the phenol used. This source of error should be removed by the initial burning out process. Direct sunlight will, also, affect the blank value as noted by Gibson and Caulfield (*14*).

Scrubber Efficiency

Numerous mixtures have been recommended as scrubbing agents, including: red phosphorous (*5*); water (*13*); saturated sodium bicarbonate (*14*); 1.5 per cent sodium thiosulphate with 0.5 per cent sodium carbonate (*15*). The mixture of 5 per cent sodium thiosulphate and 5 per cent cadmium sulphate, recommended by Friedrich (*16*), has been found most satisfactory in these laboratories. As little as possible of the mixture should be used and the temperature should be maintained at from 40 to 50 deg. C.

Absorber Efficiency

The absorbing solution used above has been found highly efficient. Independent titration, of the two receivers, shows practically 100 per cent absorption in the first tube, with a gas rate as high as 120 bubbles per minute.

Cleaning the Apparatus

After each charge of hydriodic acid, the distilling flask, column and scrubber should be carefully cleaned by rinsing with alcohol or acetone, followed by distilled water and drying with alcohol, ether, and an air stream. The receiver tubes are washed with distilled water and oven dried before use.

Accuracy Attainable

Values obtained on eight successive determinations for a soda pulp containing 4.81 per cent lignin follow:

Wt. of sample	cc. $Na_2S_2O_3$ N = 0.0342	Blank cc.	CH_3O per cent
0.3636	15.26	0.20	0.73
0.3965	16.64	0.20	0.73
0.3838	16.07	0.10	0.74
0.3614	15.10	0.20	0.73
0.3928	16.38	0.10	0.73
0.3534	14.75	0.15	0.73
0.3599	15.12	0.15	0.73
0.3935	16.44	0.20	0.73

Values obtained on four successive small samples of vanillin follow:

Wt. of sample grams	cc. $Na_2S_2O_3$ N = 0.04989	No blank	CH_3O per cent
0.00240	1.93		20.7
0.00269	2.10		20.2
0.00304	2.43		20.6
0.00318	2.46		20.0
		Theoretical =	20.4

Semibleached kraft pulps, containing as little as 0.2 per cent lignin, have been analyzed for methoxyl, as follows:

	Wt. of sample grams	Lignin per cent	OCH_3 Found per cent
A	0.7173	0.23	0.04(1)
	0.7638		0.03(6)
B	0.6932	0.27	0.07(2)
	0.7552		0.06(9)
C	0.7257	1.47	0.04(4)
	0.7088		0.04(2)
D	0.7374	0.65	0.13(0)
	0.8349		0.12(7)
E	0.7335	0.25	0.08(5)
	0.7794		0.08(4)

The conditions of bleaching used for the above samples differed widely, thus causing a great difference in the degree of demethoxylation of the lignin (*17, 18*).

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Lignin Research and Wood Chemistry Project at University of Washington

Beginning with the opening of the University of Washington last month a research project in lignin chemistry was undertaken. Alan J. Bailey of the University of Minnesota has been placed in charge of the project with the title of assistant professor of chemistry. Dr. Bailey took his doctorate at the University of Washington and the last three years were divided between the Institute of Paper Chemistry at Appleton and the Forestry and Biochemical Departments of the University of Minnesota.

Dr. Bailey will give his entire time to research into the nature of lignin and its relation to other components of wood. Fully equipped laboratories and a special library are under preparation for this study. Dr. Bailey's first public appearance will be at a statewide Chemurgic Conference in Seattle where he will discuss the precipitation method for obtaining solids from sulphite waste liquor. At this same meeting B. T. Wieniecki of the Rayonier Company Inc., Shelton, Wash., will discuss the agricultural use of Raylig—which is the trade name for the solids obtained by waste heat evaporation. These two types of lignin residues are now available in tonnage quantities in Washington and Wisconsin and constitute a primary source of raw material for chemical commodities.

Empire State Section TAPPI to Meet

The Empire State Section of the Technical Association of the Pulp and Paper Industry will meet on Saturday, Nov. 4, 1939 at the Hotel Woodruff, Watertown, N. Y. The program will consist of an afternoon session starting at two-thirty followed by turkey dinner and social evening.

The subject of the meeting will be "Water". Papers to be presented will cover phases such as clarification of fresh water and saveall operation. Equipment manufacturers have supplied, for distribution, material on new types of shower pipes and nozzles. Sufficient time will be available following the papers for discussion of them and different phases of paper mill water usage. Members are urged to come primed with questions concerning their particular prob'ems.

Sanitary Mills Start New Fourdrinier

The Sanitary Paper Mills, Burnside, Conn. recently started production on its new Fourdrinier Type Machine. This machine is equipped with Tensilastic Couch, Press, Guide, Pressure and Felt Rolls made by the American Wringer Company, Inc., Woonsocket, R. I.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard. Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp

NEW YORK IMPORTS

WEEK ENDING OCTOBER 21, 1939

SUMMARY

Newsprint .....2,177 rolls
Packing paper .....50 bls.
Wrapping paper .....30 bls., 23 rolls
Surface coated paper.....55 cs.
Miscellaneous paper .....486 bls.

NEWSPRINT

H. G. Craig Co., Inc., *Kermic,* Donnacona, 345 rolls.
H. Reeve Angel & Co., Inc., *Temnaren,* Gothenburg, 410 rolls.
Clinton Paper Co., *Temnaren,* Gothenburg, 391 rolls.
Boston Paper Board Co., *Temnaren,* Gothenburg, 186 rolls.
Perkins Goodwin & Co., *Temnaren,* Gothenburg, 312 rolls.
Parsons & Whittemore, Inc., *Temnaren,* Gothenburg, 227 rolls.
H. G. Craig Co., Inc., *Newscarrier.* Donnacona, 306 rolls.

PACKING PAPER

J. P. Heffernan Paper Co., *Barbarigo,* Genoa, 50 bls.

WRAPPING PAPER

Blauvelt Wiley Paper Manfg. Co., *Temnaren,* Gothenburg, 30 bls., 23 rolls.

SURFACE COATED PAPER

Gevaert Co. of America, *Black Condor,* Antwerp, 55 cs.

MISCELLANEOUS PAPER

The Borregaard Co., Inc., *Kungsholm,* Gothenburg. 486 bls.

RAGS, BAGGING, ETC.

National City Bank, *Black Condor,* Antwerp, 50 bls. linen threads, 1,864 bls. flax waste.
Darmstadt Scott & Courtney, *Black Condor,* Antwerp, 68 bls. bagging.
J. W. Green, *Black Condor* Antwerp, 18 bls. flax waste.
Philadelphia National Bank, *Argentina,* Buenos Ayres, 21 bls. rags.

GLUE STOCK

Darmstadt Scott & Courtney, *Argentina,* Buenos Ayres, 26 bls.

CASEIN

A. Hurst & Co., *Argentina,* Buenos Ayres, 1,000 bags.
——, *Argentina,* Buenos Ayres, 34 bags.
American British Chemical Supplies, *Astri,* Buenos Ayres, 2,700 bags, 146,000 kilos.

WOOD PULP

H. A. Hughes, *Milos,* Sweden, 570 bls. wood pulp, 95 tons.
Perkins Goodwin & Co., *Milos,* Sweden, 330 bls. wood pulp, 55 tons.
M. Sone, *Milos,* Sweden. 2,400 bls. wood pulp, 400 tons.
Bulkley Dunton Pulp Co., Inc., *Milos,* ——, 3,300 bls. wood pulp 660 tons.
Little Falls Paper Co., Inc., *Milos,* Sweden, 150 bls. wood pulp, 25 tons.
Sonoco Products Co., *Milos,* Sweden, 162 bls. wood pulp, 27 tons.
M. Sone, *Kungsholm,* Gothenburg, 225 bls. wood pulp.
J. Andersen & Co., *Kungsholm,* Gothenburg, 600 bls. dry pulp, 1,750 bls. sulphite.
Bankers Trust Co., *Kungsholm,* Gothenburg, 140 bls. sulphate.
D. M. Hicks, Inc., *Kungsholm,* Gothenburg, 150 bls. sulphite.
Castle & Overton, Inc., *Temnaren,* Gothenburg, 1,587 bls. dry bleached wood pulp.
J. Andersen & Co., *Temnaren.* Gothenburg, 2,400 bls. chemical pulp.
Perkins Goodwin & Co., *Temnaren,* Gothenburg, 300 bls. chemical pulp.
M. Sone, *Temnaren,* Gothenburg, 1,200 bls. wood pulp.
——, *Astra Riga,* 900 bls. unbleached sulphite, 180 tons; 5,110 bls. dry sulphate, 842 tons; 2,454 bls. sulphite.

WOOD PULP BOARDS

Johaneson Wales & Sparre, Inc., *Temnaren,* Gothenburg, 527 rolls.
Standard Fibre Specialties, Co., *Temnaren,* Gothenburg, 27 bls.

NEWARK IMPORTS

WEEK ENDING OCTOBER 21, 1939

Pagel Horton & Co., Inc., *Milos,* Sweden, 2,781 bls. wood pulp.

ALBANY IMPORTS

WEEK ENDING OCTOBER 21, 1939

Gottesman & Co., Inc., *Milos,* Sweden, 2,730 bls. wood pulp, 455 tons.
Pagel Horton & Co., Inc., *Milos,* Sweden, 8,325 bls. wood pulp.
H. A. Hughes, *Milos,* Sweden, 1,500 bls. wood pulp, 250 tons.
Port Orange Paper Co., *Milos,* Sweden, 600 bls. wood pulp, 100 tons.
St. Regis Paper Co., *Milos,* Sweden, 1,500 bls. wood pulp, 250 tons.
Perkins Goodwin & Co., *Milos,* Sweden, 1,200 bls. wood pulp, 200 tons.
Pagel Horton & Co., Inc., *Gunda,* Sweden, 11,000 bls. wood pulp.

PORTLAND IMPORTS

WEEK ENDING OCTOBER 21, 1939

Pagel Horton & Co., Inc., *Lagaholm,* Sweden, 2,625 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING OCTOBER 21, 1939

M. Sone, *Hjelmaren,* Gothenburg, 459 bls. wood pulp.
Pagel Horton & Co., Inc., *Lagaholm,* Sweden, 1,000 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING OCTOBER 21, 1939

——, *Astra,* Riga, 160 bls. dry sulphate, 26 tons.
M. Sone, *Astra,* Sundsvall, 600 bls. wood pulp.
Price & Pierce, Ltd., *Toledo,* ——, 625 bls. bleached sulphite.

WILMINGTON IMPORTS

WEEK ENDING OCTOBER 21, 1939

Price & Pierce, Ltd., *Sicilia,* ——, 9,150 bls. unbleached sulphite.

BALTIMORE IMPORTS

WEEK ENDING OCTOBER 21, 1939

Pagel Horton & Co., Inc., *Inger,* Sweden, 15,000 bls. wood pulp.
Pagel Horton & Co., Inc., *Svaneholm,* Sweden, 8,700 bls. wood pulp.
Pagel Horton & Co., Inc., *Oscar Gorthon,* Sweden, 17,850 bls. wood pulp.

LOS ANGELES IMPORTS

WEEK ENDING OCTOBER 21, 1939

——, *M. Johnson,* Sweden, 324 pkgs., 2,148 rolls newsprint.
——, *Kansai Maru,* Kobe, 1 cs. writing paper.

New Hancock Valve

The Hancock Valve Division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn., announces a revolutionary type of steel valve called the Hancock "No-Bonnet-Joint" Valve.

This unique new valve has been developed to end leakage through the gasket joint between the valve body and bonnet at elevated pressures and temperature. It does this because there is no joint. This feature is of particular interest to the oil, chemical and other industries handling explosive fluids where the hazard of leakage through a bonnet gasket might be dangerous.

The Hancock "No-Bonnet-Joint" Valves are made for pressures up to 2500 pounds at 1000°F.

The makers state that this new valve weighs less than a fourth as much as a conventional bolted-bonnet valve of the same size and pressure rating.

When a"No-Bonnet-Joint" is welded in the line, the only joint is that of the stuffing box for the stem. The valve may be easily disassembled in the line for regrinding.

The manufacturer claims that the annoyance of leakage through the threads between the valve seat ring and the valve body can never occur in this new Hancock Valve. For it has no threads—its Stellite seat is welded onto the valve body and is an integral part of it. The valve disc is also heavily Stellited to resist wire-drawing and wear.

"No-Bonnet-Joint" Valves are made in one basic size and then tapped, or bored for welding, for ½ inch, ¾ inch, and 1 inch pipe. This simplification cuts, by two-thirds, repair part and maintenance parts stocks and yet takes care of 90 per cent of the small valve requirements on any high pressure industrial job, the builders state.

New Speed Increasers

A new line of speed increasers for operating centrifugal pumps, highspeed blowers, and compressors, and for pipe-line service, has been announced by the Westinghouse Electric & Manufacturing Company. Standard gear ratios vary from 2 to 1 to 12 to 1, and these new units are available in ratings of from one horsepower per 1000 rpm of the high-speed shaft to more than 1800 horsepower per 1000 rpm.

Speed increasers can be supplied for either right- or left-hand assembly. Sleeve bearings have been designed to provide low unit pressures and assure permanent alignment with minimum friction loss. Lubrication is accomplished by a self-contained circulating oil system, including a circulating pump, an oil cooler, strainer, relief valve, and sight flow indicator. Gears are spray-lubricated at the line of contact; all bearings are under pressure lubrication. Frames are split horizontally to permit easy access to all internal parts, and each unit has an easily removable inspection plate. Average efficiency of these units is better than 96 per cent.

Paper Control in United Kingdom

Further regulations of the paper industry in the United Kingdom have been forwarded to the Forest Products Division of the Department of Commerce at Washington, by the Office of the American Commercial Attache, London, James W. Young, Director, Bureau of Foreign and Domestic Commerce announced today.

The order, effective from September 11:

(1) prohibits any paper mill, except on licence, from purchasing waste materials during any one month from any source of supply of waste materials other than authorised merchants in quantities in excess of those taken each month on an average during the six months prior to September, 1939;

(2) prohibits any person other than a paper mill or authorised merchant from purchasing any quantity of waste paper or rags, etc., in excess of 10 cwts. in any one transaction;

(3) fixes the prices at which waste paper may be bought from (a) producers (b) persons other than producers of waste paper.

Three schedules were issued with the order: one giving maximum prices for purchases of waste paper from non-producers; another giving maximum prices for purchases of waste paper from producers, subject to certain allowances and a third setting out these allowances. The Paper Control Department of the Ministry of Supply has also named merchants authorised to deal in waste paper making materials.

Detailed information on the contents of the various schedules and other information concerning past regulatory measures can be obtained from the Department of Commerce through the Forest Products Division. In cooperation with the Division of Foreign Tariffs of the Department, the Forest Products Division is paying particular attention to the regulatory measures of the various foreign governments as they affect the forest products industries.

New Literature

Spirakore distribution transformers are described in publication GEA-3085A issued by the General Electric Company, Schenectady, N. Y. Embodying the GE new wound-core design, these transformers are at present available in single phase, 60 cycle ratings, 1½ to 5 kva, 7620 volts and below; and 2½ kva, 11,500 and 13,200 volts.

Electric pyrometer and resistance thermometers are described in Catalogue No. 1101E, issued by the C. J. Tagliabue Manufacturing Company, Park and Nostrand avenues, Brooklyn, N. Y. A description of several Tag Celetray instruments are given. Recent developments include a self-balancing indicator potentiometer controller, single point and multiple point, recorder-controller for throttling heat, two-point indicating controller, multiple point (up to 6) indicating controller, and a cabinet type multiple point indicating potentiometer, manually operated with toggle switches for as many as 48 points.

Electric adjustable speed drive for AC circuits, is the subject of Bulletin 307, issued by the Reliance Electric and Engineering Company, Ivanhoe road, Cleveland, O. The Type V speed control unit can be placed anywhere, is for use on 3-phase 60 cycle 220, 440 and 550 volt AC current circuits. The motor is the Reliance heavy-duty Type T, designed for adjustable speed service.

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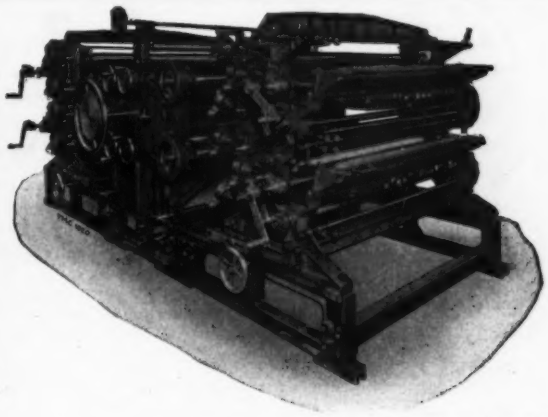

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LATEST MARKET REVIEW

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, October 25, 1939.

A state of more normal activity is reflected in the reports from the whole paper market and many manufacturers' representatives, jobbers, and general paper merchants report a steady consumer demand for practically all paper and paper products.

The index of general business activity rose to 103.2 per cent for the week ended October 14, from 102.5 per cent for the preceding week, compared with 87.7 per cent for the corresponding week last year.

Paper production of 209 mills was estimated at 99.3 per cent for the week ended October 14, compared with 83.0 per cent for the like period last year, and with 74.9 per cent in 1937. Paper board production for the week ended October 14 was 83.0 per cent, compared with 70.0 per cent for the corresponding period last year, and with 68.0 per cent in 1937.

Little change has been reported in the newsprint market for the current week, other than a small increase in consumption. Domestic production for September was 78,559 tons, Canada produced 253,230 tons, and Newfoundland 27,390 tons. Stocks on hand at domestic mills for September amounted to 16,696 tons, while 200,884 tons were reported at Canadian mills.

With the production of most mills at capacity and with orders in some cases in excess of current output, concern continues to be expressed in some quarters of the trade that over-buying and the accumulation of relatively large stocks on hand or speculation in inventories, may lead to a highly irregular market situation of a change in the international situation should unexpectedly occur. Although some trade sources express the opinion of a possibility of a decline in the present volume of business activity in some wholesale markets in January 1940, this opinion is not heard in the paper trade.

Prices on all grades of paper are firm and indicate an upward trend. Prices have been advanced moderately in standard grades of white cased book and sulphite bond and ledger papers. The representative quoted market resale prices on No. 4 sulphite bond paper is at from 7.00 to 8.50, while the A grade E.F. white cased paper is quoted at from 7.50 to 8.75, and No. 1 antique book at from 8.35 to 9.50.

Mechanical Pulp

The demand for mechanical pulp continues heavy and orders are reported in excess of supply. Prices are firm and unchanged.

Chemical Pulp

Good grades of unbleached sulphite pulp are reported in some quarters of the trade as exceeding the current supply. There is no shortage of bleached sulphite or kraft pulps. The tone of the market is firm, with higher contract prices reported on bleached kraft, which is currently quoted at from 2.75 to 3.25. Good grades of domestic kraft pulp are a little higher and current quotations range at from 1.60 to 2.12½.

Old Rope and Bagging

No important change in the old rope market has been reported for the current week. Current quotations on old domestic Manila rope are at from 3.50 to 4.00. Trading in old bagging continues slow and about on the level of last week. Prices are rather irregular with no important change in quotations reported this week.

Rags

Trading is reported a little less active in rags this week. Prices are irregular and of a nominal character. Advances on many grades of new and old domestic rags are reported. No. 1 white repacked are currently quoted at from 3.50 to 4.00; No. 2 white at from 1.25 to 2.75; No. 1 roofing at from 1.70 to 1.80; and No. 2 roofing at from 1.35 to 1.40.

Old Waste Paper

Prices on many grades of old waste paper have been advanced this week, but No. 1 mixed paper remains unchanged. Stitchless flat stock is currently quoted at from 1.10 to 1.25; new white envelope cuttings at from 1.70 to 1.80, old kraft at from 1.00 to 1.10, and strictly folded news at from .70 to .75.

Twine

Prices on soft fiber twines have been advanced this week, due to international conditions which affect the supply of raw fibers. The tone of this market is strong under a good demand.

Chemical Engineering Manual

"A Practical Manual of Chemical Engineering" by Harold Tongue, principal assistant, The Chief Engineers Department, of the London County Council, 560 pages. This well written book is the latest one to be published on chemical engineering unit operations, with emphasis on the practical aspects.

Interesting chapters deal with such subjects as steels and alloy steels, materials of construction—both metallic and nonmetallic, the design of pressure vessels, piping, heat insulation, steam plants, evaporators, drying, adsorption, filtration, grinding and pumping.

Relatively little mathematics are used although there are a number of illustrative examples. For example it is shown how to estimate the weekly fuel cost of power and relative fuel costs. A number of flow diagrams are given, including one on the kraft pulping process.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd street, New York, N. Y.

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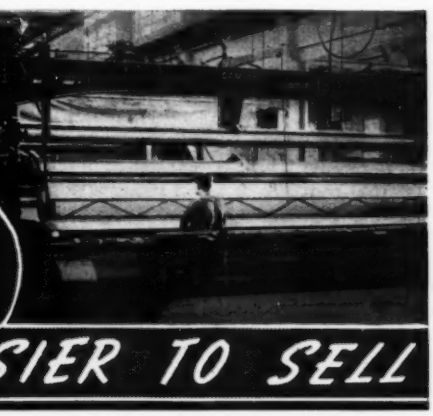

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Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, October 25, 1939.

BLANC FIXE—Quotations on blanc fixe are firm under a good demand, with prices conforming to prevailing market levels. The pulp is currently quoted at from $42.50 to $45 per ton, in bulk; the powder is quoted at from 3½ to 3¾ cents, in barrels, at works.

BLEACHING POWDER—Prices on bleaching powder are firm under a heavy demand, with prices unchanged at prevailing market quotations. Bleaching powder is currently quoted at from $2 to $2.85 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein are firm under a good demand. Standard domestic casein, 20-30 mesh, is currently quoted at 20 cents per pound; 80-100 mesh, at 20½ cents per pound. All prices in bags, car lot quantities. Prices on Argentine and French casein are nominal.

CAUSTIC SODA—The market position of caustic soda continues strong with prices firm and unchanged. Solid caustic soda is currently quoted at from $2.30 to $2.40 per 100 pounds; flake and ground at from $2.70 to $2.95 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay continue firm under an active demand. Domestic filler clay is currently quoted at from $7 to $15 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $13 to $25 per ton, ship side.

CHLORINE—Quotations on chlorine continue firm under a good demand, with prices conforming to prevailing market levels. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported as firm under a good demand. "G" gum rosin is currently quoted at $5.40 per 280 pounds, gross weight, in barrels, at Savannah. "FF" wood rosin is quoted at $5.15 per 280 pounds, gross weight, in barrels, New York. Seventy per cent gum rosin size is offered at $2.97 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake are firm under an active demand, with prices unchanged at prevailing market levels. Current quotations range at from $15 to $19 per ton; chrome sale cake at from $14 to $15 per ton, f.o.b., shipping point. Quotations on imported salt cake are nominal.

SODA ASH—Prices on soda ash are firm under a fairly active demand, with quotations unchanged at prevailing market levels. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.10; and in barrels, $1.35.

STARCH—Quotations on corn starch are firm and unchanged under a good demand. Globe pearl is currently quoted at $2.55 per 100 pounds; special paper starch at $2.65 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Prices on sulphate of alumina are firm with supplies moving steadily under a good demand. The commercial grades are currently quoted at $1.15; iron free at $1.30 per 100 pounds, in bags, car lot quantities, f.o.b., works.

SULPHUR—Quotations on sulphur are reported as firm and unchanged at prevailing market levels. Annual contracts are quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $19 per ton.

TALC—Prices on talc are firm under a good demand and unchanged at prevailing market quotations. Domestic talc is currently quoted at from $15 to $18 per ton, Eastern mines. Quotations on imported talc are nominal.

Market Quotations

Paper

(Delivered New York)

News, per ton—

Roll, contract	$50.00	●	—
Sheets	58.00	●	—

Kraft—per cwt.—Delivered Zone A

No. 1 Northern	$4.75	@	$5.25
Superstandard	4.25	@	4.75
Northern Standard Wrapping	4.00	●	—
Standard Wrapping	3.62½	@	—

Tissues—Per Ream—Carlots

White No. 1	.87½	@	—
White No. 1 M. G.	.85	@	—
White No. 1½	.62½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	..	●	—
Unbl. Toilet, 1 M.	3.25	@	—
Bleached Toilet	5.26	●	—

Paper Towels, Per Case—

Unbleached, Jr.	1.80	@	—
Bleached, Jr.	3.10	@	—

Manila—per cwt.—C. l. f. a.

No. 1 Jute	7.75	●	9.75
No. 1 Manila Wrapping, 35 lb.	5.00	●	—
No. 2 Manila Wrapping, 35 lb.	4.75	●	—

Boards, per ton—

News	45.00	@	—
Chip	45.00	@	—
Sgl. Mla. Lt. Chip	57.50	@	—
Jute Lined Chip	57.50	@	—
White Pat. Coated	70.00	@	—
Kraft Liners	45.00	@	47.50
Binders Boards	76.00	@	87.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10	$46.00	$40.25	$47.25
100% Rag	31.05	36.50	32.20	37.75
85% Rag	.....		29.90	35.00
75% Rag	23.60	27.75	24.75	29.00
65% Rag	.....		21.65	26.25
50% Rag	17.55	21.50	18.70	22.75
25% Rag	14.65	17.75	15.80	19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$8.95@$11.00	$10.10@$12.25
No. 2	8.05@ 9.75	9.25@ 11.25
No. 3	7.60@ 9.25	8.50@ 10.75
No. 4	7.30@ 9.00	8.50@ 10.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$11.90	@$13.50
No. 2 Glossy Coated	10.35	@ 11.75
No. 3 Glossy Coated	9.55	@ 11.00
No. 4 Glossy Coated	9.15	@ 10.50
No. 1 Antique (watermarked)	8.35	@ 9.50
No. 2 Offset	7.70	@ 9.00
A Grade E. F.	7.50	@ 8.75
A Grade S. & S. C.	7.75	@ 9.00
B Grade E. F.	6.95	@ 8.00
B Grade S. & S. C.	7.20	@ 8.25
C Grade E. F.	6.65	@ 7.75
C Grade S. & S. C.	6.90	@ 8.00
D Grade E. F.	6.40	@ 7.50
D Grade S. & S. C.	6.65	@ 7.75

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—

Moist	30.00	@35.00
Dry	30.00	@35.00

(Delivered)

No. 1 Domestic and Canadian	38.00	@40.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—

Prime Bleached Sulphite	2.50	@ 3.00

Prime Qualities—

Easy-Bleaching Sulphite	2.20	@ 2.35
Strong Unbleached Sulphite	2.10	@ 2.30

(On Dock, Atlantic Ports)

Kraft Bleached	2.75	@ 3.25
Kraft Light & Strong	1.65	@ 1.80
Kraft No. 1	1.60	@ 1.75

(F. o. b. Pulp Mill)

Kraft Domestic	1.60	@ 2.12½

(Delivered)

Soda Bleached	2.55	@ —

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits. Also add extra freight charges and war insurance to all quotations on imported pulp.

Domestic Rags

New Rags

All prices nominal.

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—

New White, No. 1	8.00	@ 8.25
Silesias No. 1	5.25	@ 5.50
New Unbleached	8.00	@ 8.25
Blue Overall	5.50	@ 5.75
Fancy	2.50	@ 3.00
Washables	2.15	@ 2.25
Mixed Khaki Cuttings	2.75	@ 3.00
O. D. Khaki Cuttings	3.00	@ 3.25

Old Rags

White, No. 1—

Repacked	3.50	@ 4.00
Miscellaneous	3.00	@ 3.25

White, No. 2—

Repacked	1.25	@ 2.75
Miscellaneous	1.75	@ 1.90

Thirds and Blues—

Repacked	2.00	@ 2.25
Miscellaneous	1.75	@ 1.90

Roofing Rags—

No. 1	1.70	@ 1.80
No. 2	1.35	@ 1.40
No. 3 (bagging)	1.50	@ 1.60
No. 4	.60	● .65
No. 5A	.60	● .65

Foreign Rags

All prices nominal

New Rags

New Dark Cuttings	2.25	● 2.40
New Mixed Cuttings	2.00	● 2.20
New Light Silesias	5.50	● 5.75
Light Flannelettes	5.50	● 5.75
New White Cuttings	7.00	● 7.50
New Light Oxford	4.00	● 4.50
New Light Prints	3.00	● 3.25

Old Rags

No. 1 White Linens	7.50	● 8.50
No. 2 White Linens	6.50	● 7.50
No. 3 White Linens	4.50	● —

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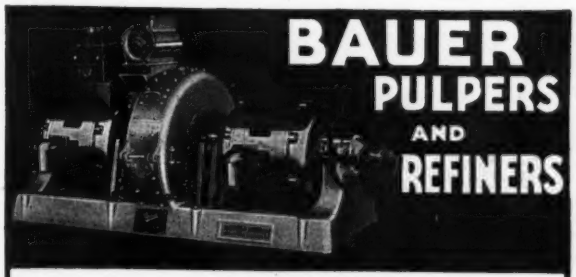

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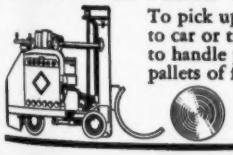

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No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	@	4.75
No. 2 White Cotton.	3.25	@	3.75
No. 3 White Cotton.	2.50	@	3.00
No. 4 White Cotton.	1.90	@	2.20
Extra Light Prints..	2.00	@	2.40
Ord. Light Prints...	1.75	@	2.15
Med. Light Prints...	1.55	@	1.95
Dutch Blue Cottons.	2.25	@	2.50
French Blue Linens..	3.00	@	—
Checks and Blues...	2.00	@	—
Linsey Garments....	1.90	@	2.00
Dark Cottons.....	1.50	@	1.60
Old Shopperies.....	1.30	@	1.45
New Shopperies.....	1.45	@	1.50
French Blues.....	2.25	@	2.50

Old Rope and Bagging

All prices nominal

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.25	@	2.50
Domestic	1.75	@	2.00
Wool Tares, light...	1.75	@	2.00
Wool Tares, heavy..	1.80	@	1.90
Bright Bagging.....	1.75	@	1.90
Manila Rope—			
Foreign	3.50	@	4.00
Domestic	3.00	@	3.50
Jute Threads.....	3.00	@	3.25
Sisal Strings	1.50	@	1.60
Mixed Strings....	.55	@	.60

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.75	@	3.00
Ordinary Hard White No. 1....	2.25	@	2.50
Soft White No. 1..	1.70	@	1.80
Soft White Extra..	2.25	@	2.40
Flat Stock—			
Stitchless	1.10	@	1.25
Overissue Mag....	1.00	@	1.10
Solid Flat Book...	.90	@	1.00
Crumbled No. 1..	.40	@	.45
Ledger Stock White.	1.55	@	1.65
Ledger Stock Colored	1.05	@	1.15
Manila—			
New Env. Cut....	1.70	@	1.80
New Cuttings.....	1.40	@	1.50
Old Kraft Machine—			
Compressed bales..	1.00	@	1.10
News—			
No. 1 White News	1.75	@	1.90
Strictly Overissue..	.60	@	.65
Strictly Folded....	.70	@	.75
Corrugated	.65	@	.75
No. 1 Mixed Paper..	.55	@	.60

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.18½	@	—
White Hemp.....	.18½	@	—
Fine Polished—			
Fine India.....	.23	@	—
Unpolished—			
Box	.14¾	@	—
Paper Makers.....	.15	@	—
Tube Rope.....	.16¼	@	—
Wall Paper.....	.15¾	@	—
Wrapping	.18	@	—
Soft Fiber Rope...	.16¼	@	—
Cotton	.21	@	—
(Hard Fiber)			
Medium Java.....	.19	@	—
Mex. Sisal.....	.16	@	—
Manila	.24	@	—
Domestic	4.00	@	4.50
Sisal Rope.....	2.00	@	2.25
Mixed Rope.....	.75	@	.80
Transmission Rope..	2.50	@	3.00
Soft Jute Rope.....	2.50	@	2.60
Jute Carpet Threads.	1.25	@	1.50
Gunny Bagging—			
Foreign	2.25	@	—
Domestic	2.00	@	2.10
Bleachery Burlap....	3.00	@	3.50
Scrap Burlap—			
Foreign .....(nominal)			
Domestic	1.62½	@	1.75
Scrap Sisal.....	1.90	@	2.00
Scrap Sisal for Shredding	2.25	@	2.50
Wool Tares, Heavy..	1.40	@	1.50
New Burlap Cuttings	3.00	@	3.12½
Aust. Wool Pouches.	2.50	@	3.00
Heavy Baling Bagging	2.00	@	2.25
Paper Mill Bagging..	1.25	@	1.50
No. 2 Bagging.....	1.25	@	1.30

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1....	.07	@	.07¼
New Light Flannelettes	.05	@	—
Silesias No. 1.....	.04	@	.04¼
New Black Silesias..	.03½	@	.03¾
Soft Unbleached.....	7.50	@	8.00
Blue Cheviots.....	.05½	@	.06
Fancy	.02	@	.02½
Washable	.02	@	.02½
Cottons—According to grades—			
Blue Overalls.....	.05¼	@	.05½
New Black, sort...	.03¼	@	.04
Khaki Cuttings.....	.02½	@	.03
O. D. Khaki.....	.03	@	.03½
Corduroy	.02¾	@	.03
New Canvas.....	.06¾	@	.07¼
B. V. D. Cuttings...	.07	@	.07½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04¼	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues.....	2.25	@	2.50
Old Blue Overalls...	1.60	@	2.00
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.50	@	1.60
Black Stockings.....	4.00	@	4.25
Roofing Stock—			
No. 1.....	1.75	@	2.00
No. 2.....	1.60	@	1.65
No. 3.....	1.00	@	1.25

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....	(nominal)
Dutch Blues.....	(nominal)
New Checks and Blues	(nominal)
Old Fustians.....	(nominal)
Old Linsey Garments.	(nominal)
New Silesias.....	(nominal)

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phil.)

Shirt Cuttings—			
New White No. 1.	.07¼	@	.07½
New White, No. 2.	.04	@	.04½
Light Silesias.....	—	@	.04½
Silesias, No. 1.....	—	@	.04½
Black Silesias, soft	—	@	.03¾
New Unbleached..	.05½	@	.06
Washable, No. 1..	—	@	.04
Blue Overall.....	—	@	.05
Cottons—According to grades—			
Washable No. 2....	—	@	.02
New Blue.....	—	@	.02
Fancy Percales.....	—	@	.03
New Black Soft...	—	@	.04
New Light Seconds	.04½	@	.05
New Dark Seconds	—	@	1.50
Khaki Cuttings—			
No. 1 O. D.....	.03½	@	.04
No. 2 Mixed.....	.03	@	.03¼
Corduroy	—	@	.02½
New Canvas.....	.05½	@	.06
New Black Mixed.	—	@	03

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.75	@	3.00
Thirds and Blues—			
Miscellaneous	2.00	@	2.25
Repacked	2.50	@	2.75
Black Stockings (Export)	3.50	@	4.00
Roofing Stock—			
Foreign No. 1.....Nominal			
Domestic No. 1...	1.50	@	1.60
Domestic No. 2...	1.35	@	1.45
Roofing Bagging..	—	@	1.30

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign .....Nominal			
Domestic	2.50	@	3.00
Manila Rope.....	—	@	4.50
Sisal Rope.....	1.75	@	2.00
Mixed Rope.....	1.25	@	1.50
Scrap—			
No. 1.....	2.25	@	2.50
No. 2.....	—	@	1.40
Wool Tares, heavy..	3.50	@	3.70
Mixed Strings.....	.75	@	1.00
No. 1 New Light Burlap	3.00	@	3.50
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	2.00	@	2.10
No. 1 Soft White.	1.75	@	1.80
No. 2 Soft White.	1.40	@	1.50
No. 1 Mixed.....	.90	@	1.00
Solid Ledger Stock..	1.50	@	1.60
Ledger Stock, white.	1.30	@	1.35
Ledger Stock, colored	1.00	@	1.10
No. 1 Books, heavy..	.80	@	.90
Manila Cuttings.....	1.90	@	2.00
Print Manila.....	.70	@	.75
Container Manila....	.65	@	.70
Kraft Paper.....	1.00	@	1.10
No. 1 Mixed Paper..	—	@	.55
Straw Board Chip...	—	@	.50
Binders Board Chip..	—	@	.50
Corrugated Board...	.62½	@	.67½
Overissue News.....	.70	@	.75
Old Newspapers.....	.65	@	.70

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White.	1.85	@	2.15
No. 2 Mixed.....	.75	@	.80
Solid Ledger Books..	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers.....	.85	@	.90
No. 1 Books, heavy..	.70	@	—
No. 1 Books, light..	.65	@	.75
Crumpled Stitchless Book Stock.....	.55	@	.65
Manila Env. Cuttings	1.70	@	.85
Manila Envelope Cuttings, Extra Quality	2.25	@	2.50
No. 1 Old Manila...	.80	@	.90
White Blank News..	1.30	@	1.40
No. 1 Kraft.....	1.10	@	1.20
Mixed Papers.....	.52½	@	.55
Print Manila	.70	@	.75
Container Manila....	.60	@	.70
Old Newspapers.....	.60	@	.65
Paper Wool Strings.	.90	@	1.00
Overissue News.....	.70	@	.75
Box Board Chips....	.52½	@	.55
Corrugated Boxes...	.55	@	.62½
Kraft corrugated boxes	.95	@	1.05
Screening Wrappers.	.60	@	.70

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	4.00	@	—

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings....	1.80	@	1.90
No. 1 Hard White.	1.70	@	1.80
No. 1 Soft White..	1.50	@	—
Ledger & Writings..	.75	@	.80
Solid Books.....	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts.....	1.10	@	—
Manila Env. Cuts...	Nominal		
Ex. No. 1 Manila...	Nominal		
Print Manila	Nominal		
Overissue News.....	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.30
Roofing Stocks—			
No. 1.....	1.00	@	1.05
No. 2.....	.85	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots

No. 1 White $35.50		@	—
No. 1 Tints	36.50	@	—
No. 2 White	25.50	@	—
No. 2 Tints	26.50	@	—
No. 2 Golden Rod..	27.50	@	—
No. 3 White	21.00	@	—
No. 4 White	15.00	@	—
No. 4 Tints	16.00	@	—
No. 4 Golden Rod...	17.00	@	—
Direct mill shipment in three-ton lots			
No. 5 White $10.50		@	—
No. 5 Tints	11.50	@	—
No. 5 Golden Rod..	12.00	@	—
No. 6 White	9.00	@	—
No. 6 Tints	9.50	@	—
No. 6 Golden Rod..	11.00	@	—
No. 7 White	8.00	@	—
No. 7 Tints	8.50	@	—
No. 7 Golden Rod..	10.00	@	—
Book—			
No. 1 M. F.	$7.00	@	—
No. 2 M. F.	6.50	@	—
No. 3 M. F.	5.35	@	—
No. 1 S. C.	7.25	@	—
No. 2 S. C.	6.75	@	—
No. 3 S. C.	5.85	@	—

Coated Book & Litho

Ton Lots (resale)

No. 1 .....$12.00		@	—
No. 2	10.25	@	—
No. 3	8.90	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown.....	4.85	@	5.25
White Wrap.....	4.00	@	—
"B" Manila.....	4.90	@	6.15
No. 1 Manila.....	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2.....	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)..)46.00		@	—
Sheets 54.00		@	—

Pulp

Ground wood.....$32.00		@	36.00
Unbleached sulphite.	44.00	@	—
Bleached sulphite...	54.00	@	—
Kraft	50.00	@	—
Soda	54.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut...	2.00	@	—
Soft White.....	1.75	@	—
White Blk. News..	1.25	@	1.10
Book and Ledger—			
Flat Magazine and Book Stock (old)	.70	@	—
Light and Crumpled Book Stock.	.60	@	—
Ledgers and Writings	1.00	@	—
Manilas—			
New Manila Cut...	1.35	@	—
Printed Manilas...	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue..	.50	@	—
Strictly Folded....	.45	@	—
No. 1 Mixed Paper..	.30	@	—

Domestic Rags

(Price to Mills, f.o.b. Toronto)

No. 1 White Shirt Cuttings	.07	@	.07¼
Light Prints.....	.03¼	@	.03½